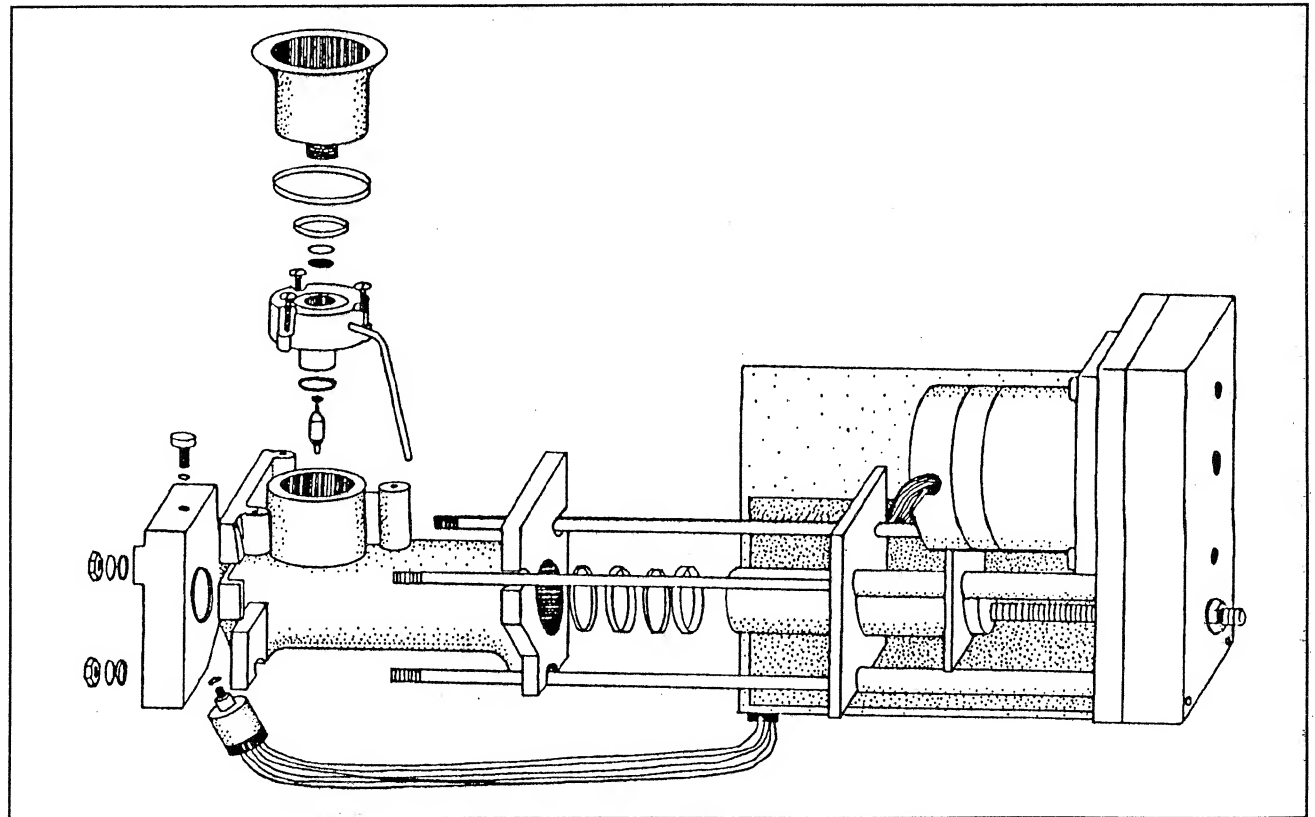


Service Manual: IRIS 3024 Color Ink Jet Printer

Revision 1.2, November 1, 1988

IRIS

IRIS Graphics, Inc.
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Bedford, Massachusetts 01730



*"Service Manual:
IRIS 3024 Color Ink Jet Printer"*

IRIS Graphics Part Number 01367-100

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A

Introduction

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Purpose of this Document

This document describes for service personnel the field service procedures for the IRIS Series 3000 Color Ink Jet Printers. It is intended for field engineering personnel who are familiar with the general principles of operation of continuous ink jet printers and computer color technology.

Procedures that are performed routinely by operators who use the printer in production can be found in the *Operator's Manual*. You should have a copy of the *Operator's Manual* as well as this manual. Some of the adjustment and maintenance procedures are described in full only in the *Operator's Manual*.

IRIS strongly recommends that you read the *Operator's Manual* and familiarize yourself with the daily operation of the printer before you tackle servicing and maintenance operations.

The IRIS 3024 Color Ink Jet Printer

The continuous ink jet technology developed by IRIS Graphics, Inc., is a non-impact printing method used to print color hard-copy images directly from high-resolution video images created on digital computer systems, including color pre-press systems and color workstations used in engineering and design applications. Based on the continuous-flow principles developed and patented by Dr. C. Hellmuth Hertz of Sweden in the late 1960s, IRIS continuous ink jet imaging is distinguished by its ability to place very small droplets (15 microns in diameter) accurately over large areas, producing color images that rival the resolution and color fidelity of photographic processes.

All IRIS color printing systems use four ink nozzles, one for each of the subtractive colors: yellow (abbreviated to "Y" in the following technical descriptions), magenta (M), cyan (C), and black (K). Each nozzle fires about one million droplets of ink per second toward a spinning drum on which paper or another printing medium is mounted. An electrode at the nozzle tip creates a charge on droplets

that are not to be printed, and the droplets pass through a deflection field that forces charged droplets into a waste gutter. Only the uncharged droplets reach the surface of the printing medium. The four ink jets and the deflection structure are mounted on a carriage that travels parallel to the axis of the spinning drum.

The IRIS 3024 Color Ink Jet Printer can produce images up to 24" by 24" at vertical resolutions of 200, 240, or 300 dots per inch and 8, 10, or 12 pixels per millimeter. Choices for horizontal resolution are preset at the factory to 200, 240, or 300 dots per inch (for English-units printers) or 8, 10, or 12 pixels per millimeter (for metric versions).

Data Input Options

IRIS 3000 technology includes an open interface architecture to permit linkage to a wide variety of color imaging systems. The basic control unit consists of an IRIS-manufactured microprocessor board running an Intel 8088 chip and Jet Offset RAM. This unit controls all basic mechanical sequencing functions of the printer.

Physical interface options include

- a Versatec-compatible 8-bit parallel on-line interface, permitting the host system to execute most printer operations and select settings (drum speed, resolution, image replication, etc.), or

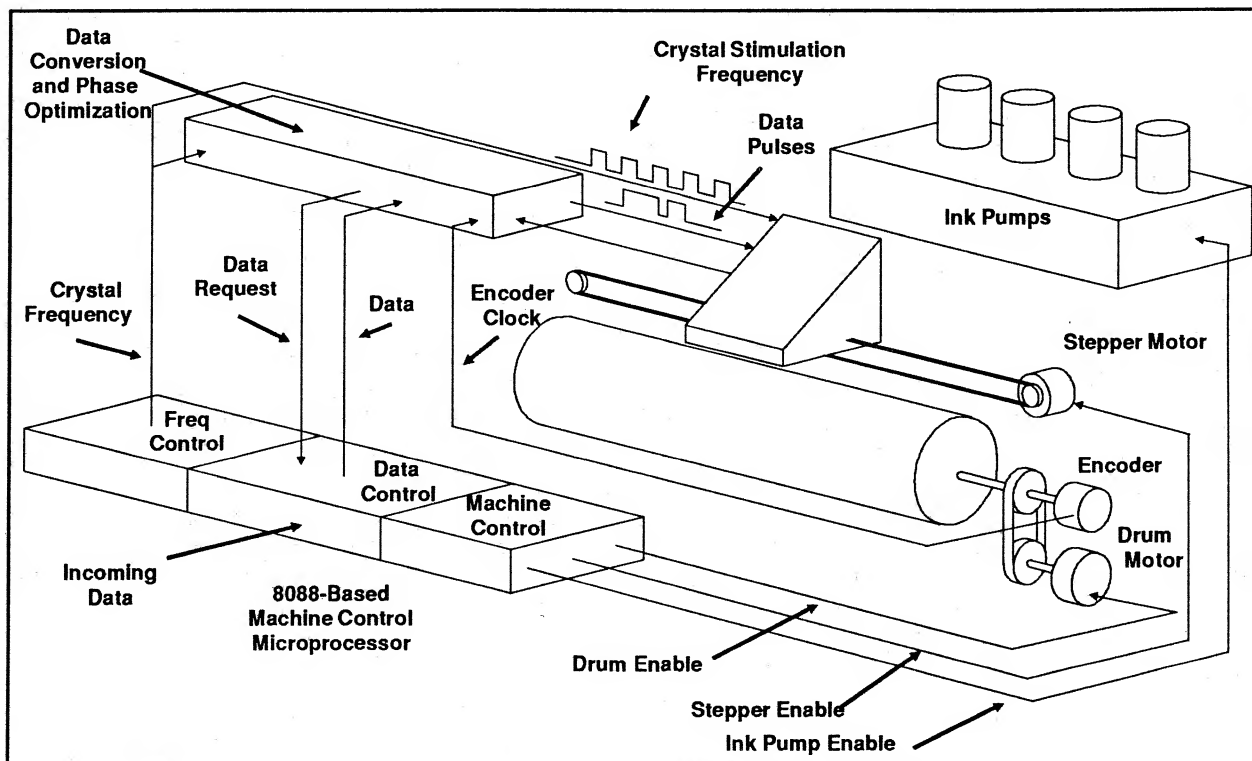


Figure A-1: Control Mechanisms and Ink Delivery System of the IRIS 3024 Color Ink Jet Printer

- a Pertec-compatible tape drive controller (1600/6250 bpi) that accepts image data stored in a CMYK, pixel interleaved format.

Organization of this Service Manual

The remainder of this Service Manual is organized as follows:

- **Section B: Troubleshooting Guide** contains lists of problems that may be encountered during normal operation and suggested remedies for those problems, organized in order of likely cause of the problem.
- **Section C: Routine and Periodic Maintenance Procedures** lists maintenance procedures that should be performed daily, procedures that should be performed when printing problems occur, weekly maintenance, and preventive maintenance that should be performed every six months.
- **Section D: Tools Required in Service/Maintenance Procedures.** A description of the tools and equipment required or recommended for the maintenance and repair procedures in this manual. Each procedure in the body of the manual lists the tools required for that procedure. Before beginning a procedure, refer to the list of tools.
- **Sections E through L** contain service procedures for the specific subsystems of the printer. Each section contains one or more illustrations that identifies parts, subsystems and adjustment points. Where part numbers apply, they are provided.
- **Section M: Spare Parts List.** A list of all spare parts available from IRIS Graphics for the IRIS 3024 Color Ink Jet Printer.
- **Section N: Service Log.** Record all servicing and repair on the printer in the Service Log. Always keep an unmarked copy of the "EXTRA"

page of the Service Log. If you need additional blank pages, copy this page and insert the copies in the manual.

- **Section O: Index.** An alphabetical listing of all major terms. References to terms or parts that occur in illustrations are identified explicitly.
- **Section P: Appendixes.** Appendixes included with this revision of the Service Manual include an "Acceptance Test Procedure Checklist."

Updating the Manual

IRIS Graphics will update this manual periodically by sending you new or replacement sections for the manual. Each update will be accompanied by a new Table of Contents that identifies the sections that must be replaced. Always make certain that the contents of the manual corresponds to the revision dates in the Table of Contents.

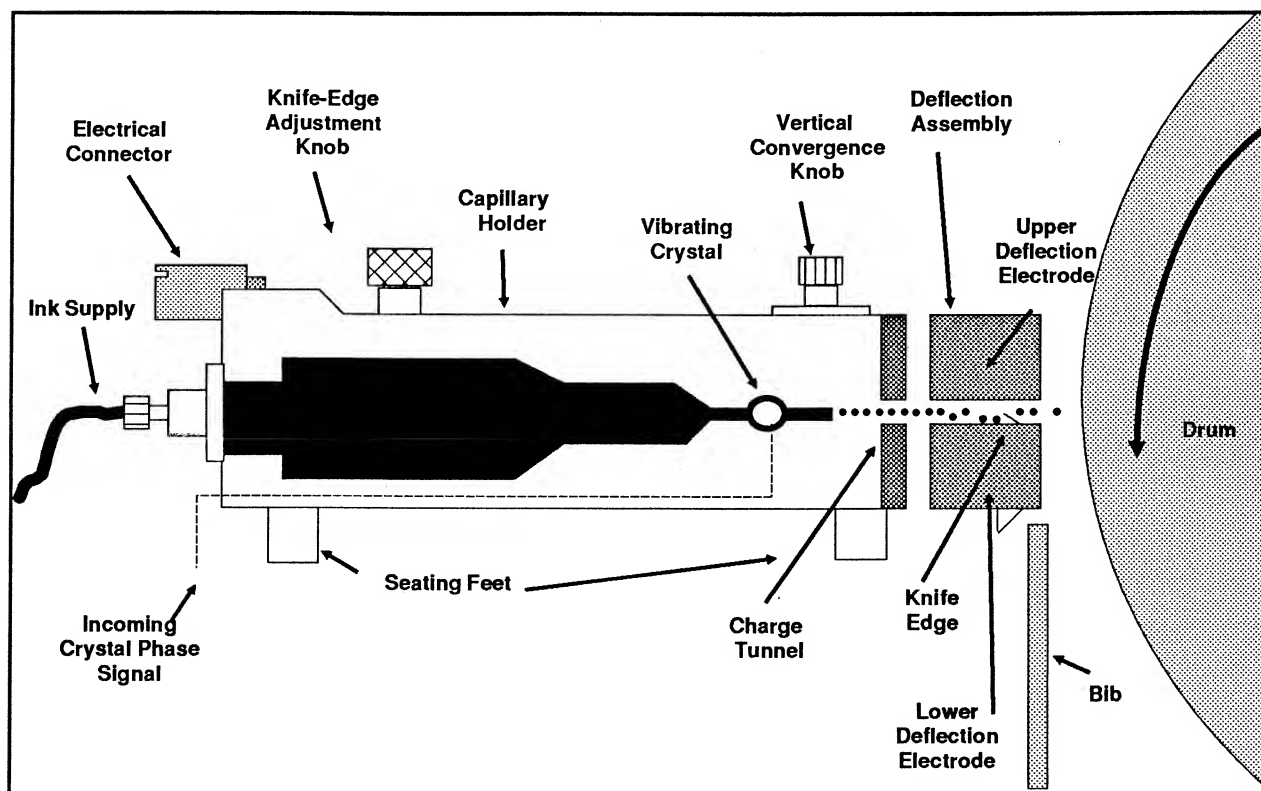


Figure A-2: Deflection of Charged Droplets. Droplets charged individually in the "charge tunnel" are deflected downward in the deflection assembly and strike a "knife edge." Only uncharged droplets reach the printing surface. (Not drawn to scale.)

B

Troubleshooting Guide

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Diagnostic Error Messages

Error Message	Probable Cause	Suggested Remedy
ACKNOWLEDGE ERRORS	Errors have been reported during printing.	Acknowledge report by pressing Yes button on control panel.
ADC READ ERROR	Defective MCP	Replace MCP.
BAD COMMAND COUNT	Host system has sent a command with an incorrect count value.	Verify integrity of print file; try alternate file; swap out interface boards on printer and/or source device.
BAD HOST COMMAND	Host system has sent a non-existing command.	Verify integrity of print file; try alternate file; swap out interface boards on printer and/or source device.
BAD RASTER LENGTH	Image data raster is not correct length—number of bytes received is not divisible by number of colors in data type OR number of bytes received changes during print cycle.	Check Data Type values in menus. Verify integrity of print file; try alternate file; swap out interface boards on printer and/or source device.
CALIB. INK PUMP	Ink pumps specified require re-calibration.	Run flow calibration routine. Check system for leaks. Check pump pressures with voltmeter. Recalibrate pump board if needed.
COVER OPENED	Cover was opened during print run, causing abort.	Restart print run. (Use print switch to suspend printing temporarily before opening cover.)
CPU COMMUNIC. ERROR	Bad cable to Upper Control Board (UCB); no voltage to UCB; defective UCB.	Plug monitor into J24 of MCP. Expanded output will clarify error.
DRUM SPEED ERROR	Drum could not reach preset speed within time limit.	Check belt tension and encoder/drum board connection. Check drum speed selected.
HIGH PRES. PUMP	Ink jet clogged or pump needs calibration. The message will indicate one, two, three, or four ink jets.	Clean or replace the ink jet[s]. If these changes do not eliminate the message, run the flow calibration routine. Check actual pump pressure and recalibrate ink pump PCB if needed.
HOST SHUT DOWN	Parallel version; abort command.	None — host aborted with command.
HOST STATE ERROR	Host system sent a command that violated system state rules. (See parallel interface spec.)	Verify integrity of print file; try alternate file; swap out interface boards on printer and/or source device.
HV SPIKE	Deflection voltage failed during printing of a raster but did not remain in that state.	Check for foreign matter causing arcs across upper/lower electrode gap in deflection assembly. If this message occurs repeatedly, wash the deflection assembly. (See Section 4, "Cleaning the Deflection Assembly.")

ILLEGAL HOST VALUE	Host system has sent a command that contained an illegal parameter value.	Verify integrity of print file; try alternate file; swap out interface boards on printer and/or source device.
INK PUMP ERROR	Ink pump is in error state during a print cycle.	Check for glowing ink status light. Use Procedure 4-4 of the <i>Operator's Manual</i> to purge the pump and return it to operating pressure. Check ink delivery system, including floats, lines, and other components.
INK PUMP TIME OUT	Pump failed to reach pressure within specified time period.	Check pump operation and replace/repair as needed.
INK PUMP NOT HOME	Pistons of one or more ink pumps have not returned to home position.	Wait until piston returns and retry printing.
INPUT ADDRESS ERROR	Defective interface board	Replace interface board.
INPUT BOARD ID ERROR	Data input board identity is not known by MCP.	Verify presence and proper seating of interface board. Replace if necessary.
INPUT DATA ERROR	Defective interface RAM	Replace interface board or RAM if socketed.
INPUT MAPPING ERROR	CPU cannot read correct memory bank in interface board.	Replace interface board.
INPUT TIME OUT	Data input was not received within time limit from host system.	Check data rate or tape drive.
KNIFE EDGE 1234	Knife-edge adjustment is recommended for the jet numbers listed.	Follow Procedure 4-1 of <i>Operator's Manual</i> for knife-edge adjustment of suspect jets. Check head voltages. Check for presence of ink, target block signals, deflection structure seating, condition of nozzle and knife edge.
LOW PRESS PUMP	Leak in ink delivery system or pump needs calibration. The message will indicate one, two, three, or four colors (ink delivery systems).	Check the ink delivery system[s] for leaks and tighten or repair as needed. If these changes do not eliminate the message, run the flow calibration routine (Section 4).
MARGIN SWITCH	Right margin encountered during print run, causing abort. (Attempted to print data beyond right edge of drum.)	Check horizontal offset, size of image.
MCP ADDRESS ERROR	Defective MCP address lines.	Replace MCP. NOTE: Defective MCP RAM may cause this error message.
MCP DATA ERROR	Defective MCP chip.	Replace MCP RAM, color look-up table RAM, or battery RAM.
PAUSE MODE CANCELLED	Operator pushed "Next" or "Select" button during Pause Mode.	Avoid pushing Control Panel buttons during Pause unless you are trying to abort a print run.
STEPPER TIME OUT	Stepper did not complete stepping programmed number of steps within time limit.	Check for lint in deflection structure. Check for evidence of high-voltage spikes.

Diagnostic Error Messages (continued)

Error Message	Probable Cause	Suggested Remedy
TAPE NOT ONLINE	(Tape version only.) Magnetic tape drive is not set to on-line status.	Put tape drive on-line and retry.
VACUUM ERROR	Vacuum level is not correct.	Check the fuse on the vacuum pump. Check vacuum pump operation. Check for signs of ink contamination in vacuum pump, find cause, and take corrective action.
VOLTAGE OVERLOAD	Deflection voltage has failed because of electrical short or malfunction in deflection assembly or electronics.	Wash deflection assembly or look for foreign matter across upper/lower electrode gap.
WASTE BOTTLE IS FULL	Waste ink bottle is detected as full.	Empty waste ink bottle and replace in printer.
WASTE BOTTLE MISSING	Waste ink bottle is not detected in holder.	Replace waste ink bottle in printer.

Printing Problems

Problem	Suggested Remedy
Mottled appearance in solid color areas (especially in areas of 50% density).	• Perform crystal frequency color run and select new crystal frequency.
Striations in solid color areas.	• Perform crystal frequency color run and select new crystal frequency.
"Smearing" of edges—single color OR smearing within of single color within image.	• Adjust knife edge. • Perform crystal frequency color run and select new crystal frequency. • Replace deflection assembly.
Undesirable overall "background color" on print.	• Adjust knife edge. • Run crystal frequency color bars and select new crystal frequency.
Round blobs of ink on print.	• Clean bib and remove foreign matter. • Clean deflection assembly. • Replace bib.
"Comets" of ink. (May not show long "tail.")	• Check front (drum end) of deflection assembly for lint or other foreign matter; clean. • Check front of bib for lint; clean.
Poor color registration.	• Run grid patterns and adjust convergence.
Surfaces inside machine begin to collect ink mist.	• Run with dust cover ("hat") in place for mist control. • Check static brush and replace if necessary. • Clean all surfaces.
No ink in one color.	• Check knife-edge adjustment. • Run color bars and grid pattern to verify proper operation in Operator Mode. • Replace clogged nozzle. • Run crystal frequency color bars and select new crystal frequency.

Knife-Edge Adjustment Problems

Sometimes during the Knife-Edge Adjustment Procedure (see *Operator's Manual*), the center value on the control panel display will not approach 0 (zero). If this occurs, look for the following possible causes and apply the suggested remedy. If the knife-edge problems persist, check the head electronics test points for correct voltage levels and check to see whether the adjustment problems are limited to one color. Please refer to page P-2, steps 2.a. through 2.c.

Possible Cause	Suggested Remedy
Dirty ink jet nozzle or deflection assembly.	Clean nozzle or deflection assembly.
Ink jet stream striking side of charge tunnel.	Check vertical convergence adjustment and readjust if necessary.
No ink pressure (all values stay near 50).	Check pumps and nozzles for clogging.
Dirty target block (values running into 80s and 90s).	Remove, wash, dry, and reinstall target block.

NOTE: If the static brush is arcing against the drum cap, knife-edge readings may fluctuate.

Other Problems

Possible Cause	Suggested Remedy
Noisy ink pump.	Noise is normal for metal-gear pumps of this type, but excessive noise may indicate that frequency output is incorrect. Check the output frequency at pin 13 of U4 on the appropriate pump board. Adjust to 900 Hz using R14.

C

Routine and Periodic Maintenance Procedures

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Daily Maintenance

The following should be checked every day.

- Check knife-edge adjustment and adjust if necessary.
- Inspect bib for discoloration or ink saturation. Wash and reinstall if necessary.
- Inspect surface beneath and behind drum for ink spillage. Clean up all ink and check for source of spilled ink.

As-Needed Maintenance

If you encounter print-quality problems, check the following and perform the required maintenance:

- Perform knife-edge adjustment. (Always check knife-edge adjustment first when you encounter print-quality problems.)
- Run color bars.
- Perform frequency color run.
- Check convergence.
- Clean the deflection assembly.
- Wash the ink jet nozzles.

See also Section B for a more detailed description of print-quality problems and their resolution.

Weekly Maintenance

- Clean the deflection assembly. (Clean at least twice per week during periods of heavy use. If you observe VOLTAGE OVERLOAD error messages on the control panel, clean the deflection assembly more frequently.)
- Check convergence and adjust if necessary.
- Check disposable waste ink filter. Replace if filter shows blotches of ink.
- Clean the bib at least once per week.

Monthly Maintenance

- Replace the disposable air filter in the vacuum pump (IRIS part number 00408-001).

Six-Month Inspection and Preventive Maintenance

- Remove, clean, and reinstall the target block.
- Check the chassis fan, vacuum pump fan, and air MCP power supply for proper rotation and air flow.
- Check the collector bowls in the vacuum pump. They should be clean and dry.
- Verify the head electronics voltages (see Acceptance Test Procedure, Section P.)
- Check all vacuum lines and plumbing fittings.
- Wipe off the carriage rails with a clean, dry, soft cloth.
- Wipe the pulleys and band (both sides) with a clean, dry soft cloth.
- Check all printer surfaces for ink spillage, including beneath ink pumps. Excessive ink spillage usually indicates a leak.

D

Tools Required in Service/Maintenance Procedures

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This Section consists of a description of the tools and equipment required or recommended for the maintenance and repair procedures in this manual. Each procedure in the body of the manual lists the tools required for that procedure. Before beginning a procedure, refer to the list of tools.

Dial Indicator with Magnetic Base

A dial indicator with a ball-and-socket neck that allows positioning of the dial indicator at any angle — with magnetic base. This tool is used in measuring run-out on the drive pulley. (Brown & Sharpe part # EDP No. 51083, "Miti-Mite Holder and BesTest Indicator Set" or equivalent.)

Digital Voltmeter

(Fluke part # 77 or equivalent.)

High-Voltage Probe

(Fluke part # 80K-6 or equivalent.)

Inspection Mirror

Rectangular inspection mirror ($2\frac{1}{8}" \times 3\frac{1}{2}"$) extendible from 11" to 15".

Loupe or Magnifying Glass

Five-power to 10-power achromatic magnifying glass for examining print quality.

Offset Ratchet Kit . . . IRIS Part No. 00000-001

Multi-purpose tool set, often referred to informally by IRIS personnel as a "Chapman" set. (Chapman Machine Co. part #6320 or equivalent.) The Offset Ratchet Kit is used in a large percentage of the procedures in this manual.

Screw Starter for Phillips-type Screws

Screw-holding Phillips-type screwdriver. Length: $9\frac{3}{4}"$.

Service Zipper Kit

Portable service/repair kit containing selection of tools. Models 19-Z8 (86-piece) 18-Z6 (85-piece) or equivalent.)

Syringe and Needle

5 cc.-capacity Luer-Lock disposable syringe that accepts interchangeable needles. Needle should have interior diameter of .054" and length of 1".

Tweezers

Precision Dumont-style tweezers with honed points, $4\frac{3}{4}"$ long.

Band-Tension Adjustment Weight

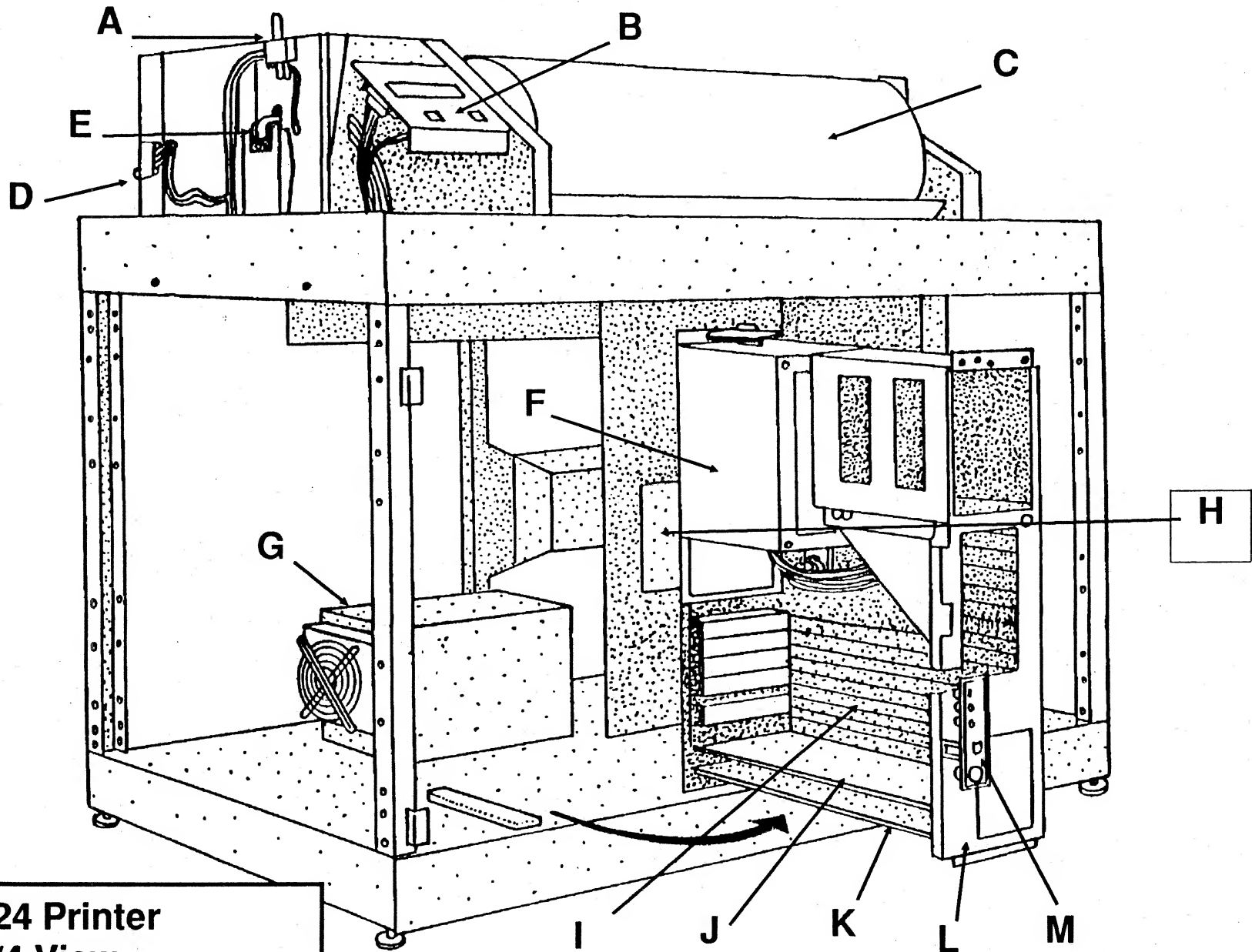
Eight-ounce weight for adjusting tension of carriage band.

E

Chassis

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**IRIS 3024 Printer
Front 3/4 View**

IDENTIFICATION OF PARTS

IRIS 3024 Printer

Front 3/4 View

- A** Mode Switch
- B** Control panel
- C** Drum
- D** Safety Switch
- E** Drive Band Idler Pulley
- F** MCP Power Supply
- G** Vacuum Pump
- H** Solenoid Driver Board
- I** MCP Board
- J** Interface Board
- K** Jet Offset RAM Board
- L** MCP Cabinet (swing out)
- M** Logic Reset Switch

Removing the Gas Spring(s)

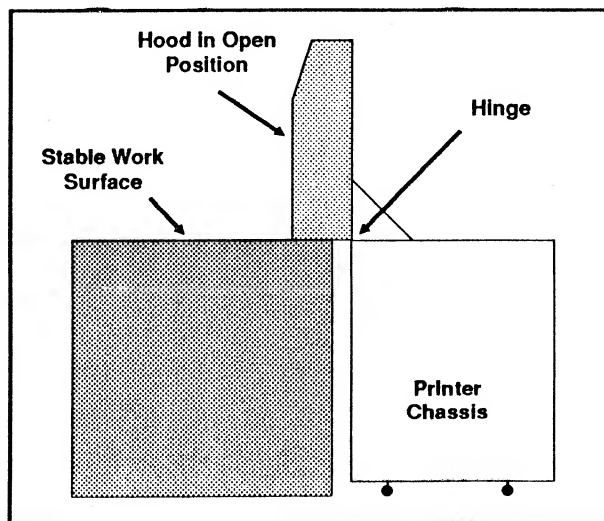
The gas springs that control and restrain the movement of the hood may fail after prolonged use.

PROCEDURE

Removing a gas spring

Tools Required: Pliers, Phillips-head screwdriver

- 1** Shut down the printer.
- 2** Place a stable work surface the same height as the hood hinge (for example, a sturdy table) behind printer. This will allow you to rest the hood on that surface after disconnecting both gas springs.
- 3** Remove the safety pin that secures the spring to the pivoting ball and socket that mounts the spring to the hood.
- 4** Then remove the safety pin that secures the spring socket onto the pivot ball that is mounted on the printer chassis and pop spring off pivot ball.



Removing the Hood (Cover)

Removing the hood should rarely be necessary unless the hood is damaged in some way (for example, during shipping) or needs to be repainted. However, it may be useful at times to remove the hood to gain better access to the machine.

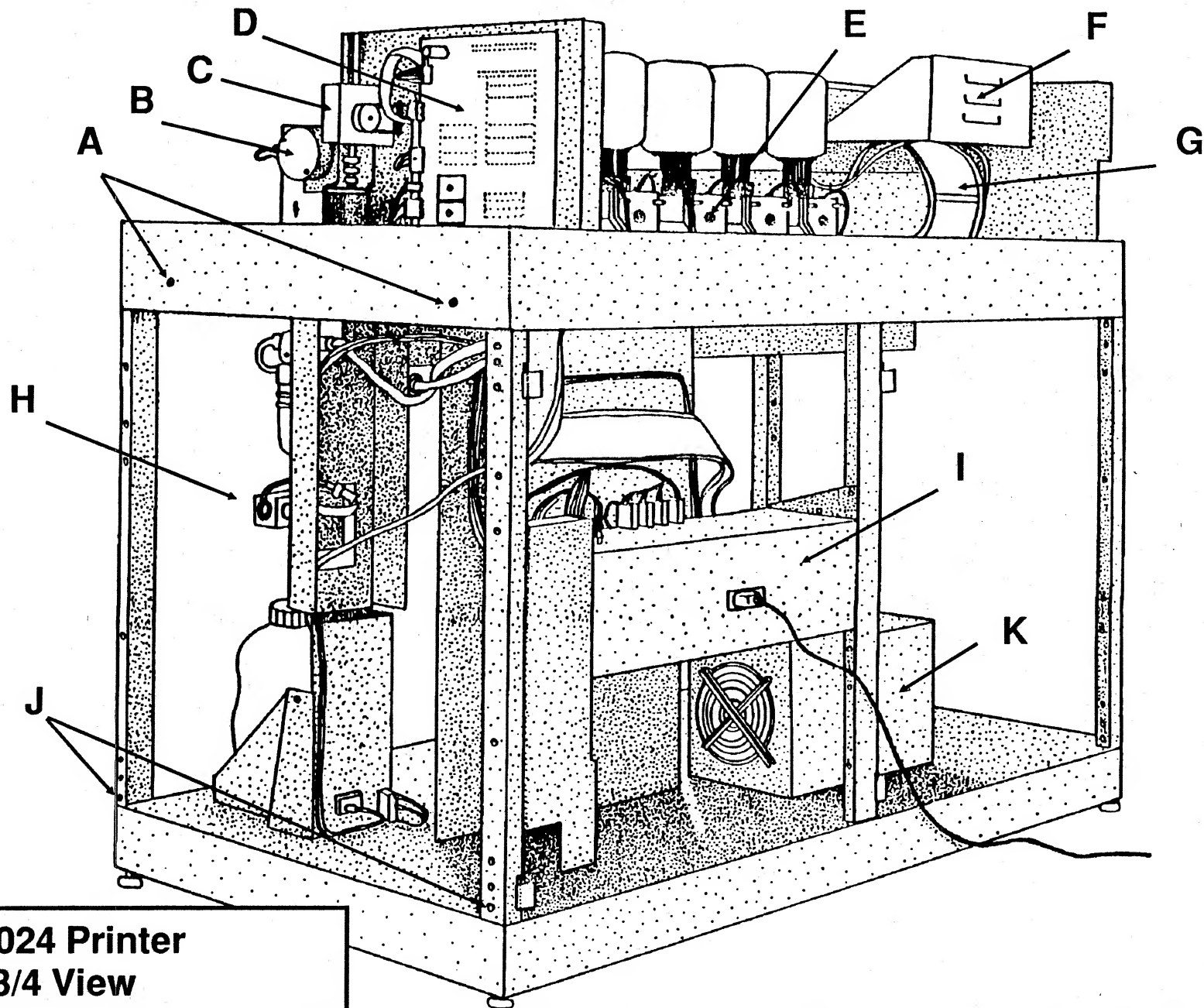
PROCEDURE

Removing the hood

Tools Required: Pliers, Phillips-head screwdriver

CAUTION: The hood is heavy. Two people will be needed for this procedure.

- 1** Shut down the printer.
- 2** Place a stable work surface the same height as the hood hinge (for example, a sturdy table) behind printer. This will allow you to rest the hood on that surface when you disconnect the gas springs.
- 3** Detach the top ends (hood ends) of the gas springs only, and allow the hood to rest on the work surface.
- 4** While one person steadies the hood, the second person should remove screws from the printer side of the piano hinge.
- 5** To reinstall the hood, reverse Steps 1 through 4.



**IRIS 3024 Printer
Back 3/4 View**

IDENTIFICATION OF PARTS

IRIS 3024 Printer

Back 3/4 View

- A Upper Panel Attachment Holes
- B Encoder
- C Carriage Drive Assembly
- D Upper Control Board #01760-001
- E Ink Pump #01038-001
- F Head Assembly
- G Umbilical Cable
- H Waste Ink System
- I AC/DC Distribution #00776-001
- J Lower Panel Attachment Holes
- K Vacuum Pump Assembly . . . #00649-001

Attaching/Removing Doors

With the exception of the left rear door ("left" as viewed from the rear of the printer), the doors on the front and rear of the printer are interchangeable. The left rear door contains a hole for the AC power input.

The doors are mounted on hinges. To remove a door: open the door slightly and lift it up off its hinges.

The height of the doors is adjusted by adding or removing spacers (bushings, washers). This adjustment is made at the factory before shipment.

Each door is held shut by a magnetic catch.

Attaching/Removing Side Panels

Tools Required: Ratchet offset kit

The side panels are attached by four screws to two holes ("panel attachment holes") in the upper part of the chassis and two holes in the lower part of the vertical frame members.

All four screws should be started before any are tightened. The hole tolerances are such that inserting the screws forces the frame of the printer to be square. **Do not enlarge these holes** for ease of assembly.

IMPORTANT: All screws must be tightened firmly to make the printer's frame rigid and to reduce the likelihood of harmonic vibrations that may adversely affect print image quality.

Removing/Replacing the Printer Cooling Fan

Tools Required: Ratchet offset kit

The printer cooling fan is mounted horizontally inside the printer above the solenoid driver board that controls vacuum and approximately in the center of the printer on a channel that runs the length of the printer.

The fan draws air in and distributes it via the channel to both sides of the machine.

You can remove the fan by shutting the printer down, detaching the electrical connection, and removing the four screws.

Install a new or replacement fan with the arrow that indicates air flow direction pointing up.

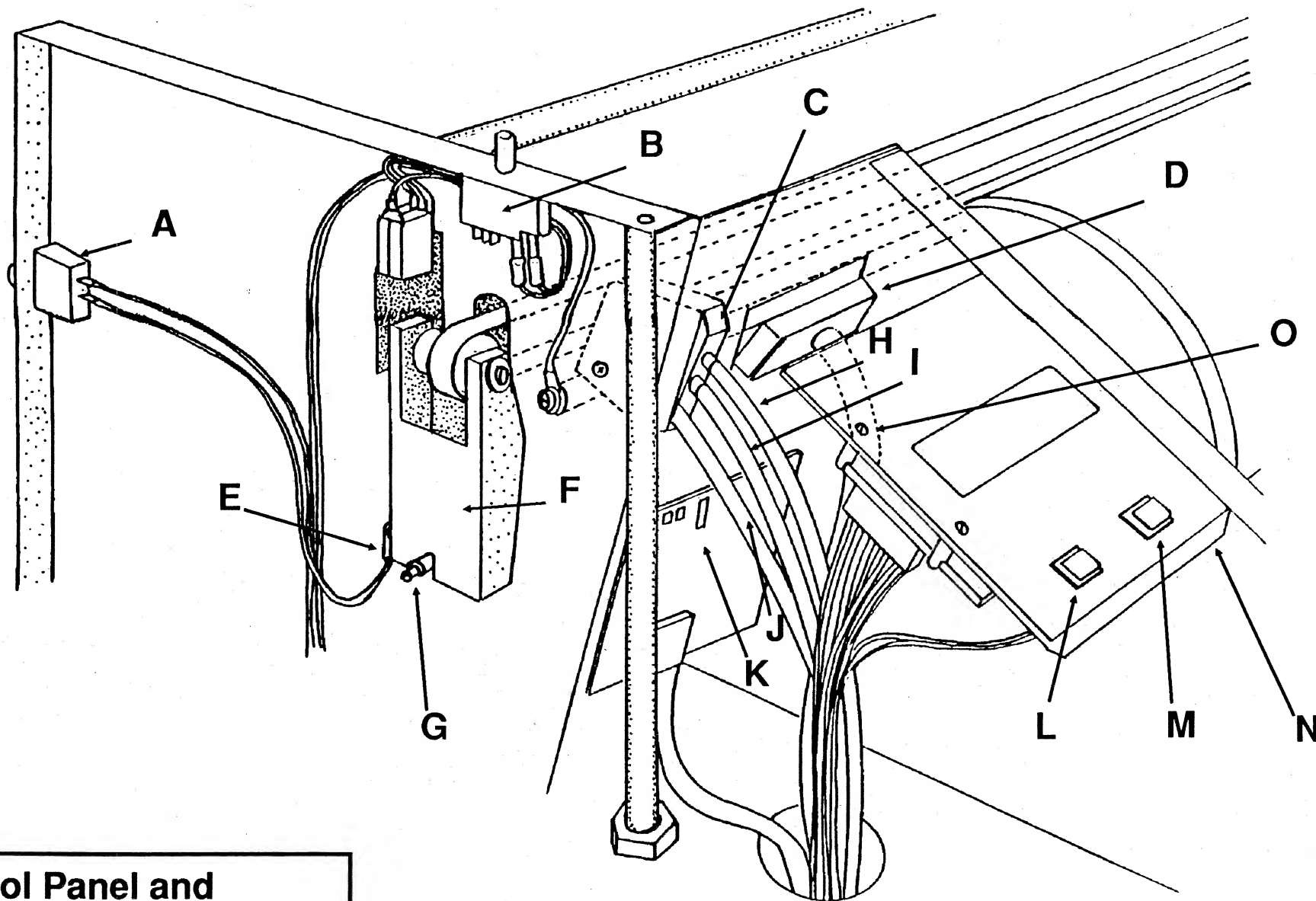
IMPORTANT: Replace the cooling fan only with IRIS Part Number 00294-001.

F

Carriage Drive Assembly

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**Control Panel and
Interlock System**

IDENTIFICATION OF PARTS

Control Panel and Interlock System

- A** Cover Interlock (Safety Switch)
- B** Mode Switch
- C** Evacuation Block
- D** Target Block
- E** Band Tension Interlock Switch
- F** Idler Pulley/Rocker Assembly
- G** Band Drive Tension Adjuster
- H** Upper Deflection Vacuum Line
- I** Lower Deflection Vacuum Line
- J** Nozzle Vacuum
- K** Target Block Amp
- L** "Next" Button
- M** "Select" Button
- N** Control Panel
- O** Target Block Vacuum Line

Adjusting the Tension of the Carriage Band

The carriage band idler pulley is mounted on a rocker on the left side of the printer. The rocker is spring-loaded to maintain tension on the carriage band. The idler pulley puts tension on the band. If the band breaks, the rocker will swing down and the band-tension interlock switch will shut down the printer.

PROCEDURE

Adjusting the tension of the carriage band

Tools Required: Ratchet offset kit, two 11/32" ignition-type box wrenches, **force gauge**

- 1** Be sure the head is in the left-most position (not in "Service Position")
- 2** Shut down the printer.
- 3** Remove the left bulkhead cover.
- 4** Identify the idler pulley.
- 5** While applying a force of eight (8) ounces to the middle of the upper drive band, loosen or tighten the nut on the idler tension spring until the upper band is 1/32" from the lower band.

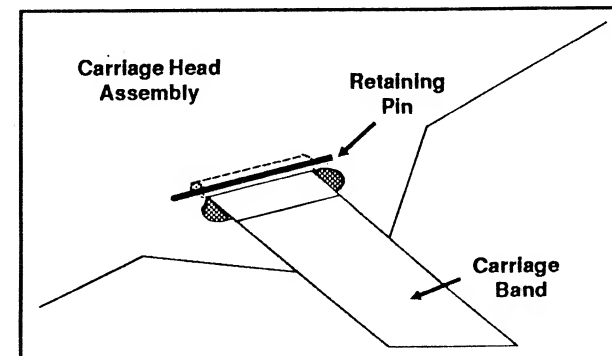
Replacing a Carriage Band

PROCEDURE

Replacing a carriage band

Tools Required: Two 11/32" ignition-type box wrenches, needle-nose pliers

- 1** Shut down the printer.
- 2** Open the printer cover and remove the both bulkhead covers.
- 3** Release the tension on the carriage band by loosening the spring on the rocker (idler pulley — left side of printer).
- 4** Each end of the band has a loop on it. Using the needle-nose pliers, remove the pin that secures each end to the carriage head assembly.
- 5** To install a new band, reverse the procedure.

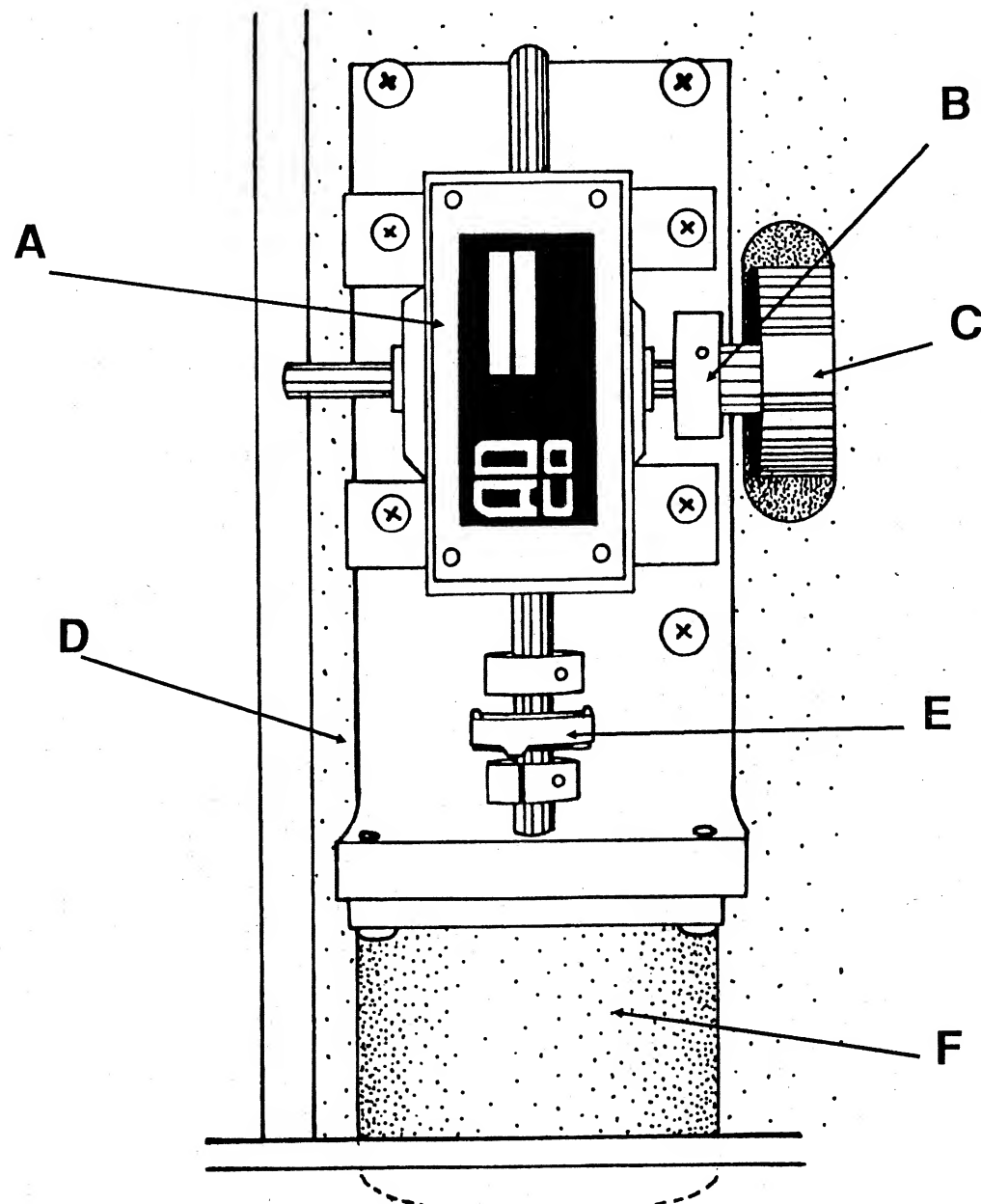


IDENTIFICATION OF PARTS

IRIS 3024 Printer

- A** 60:1 Gear Box
- B** Pulley Clamp
- C** Drive Pulley
- D** Bracket
- E** Motor/Gearbox Coupling
- F** Stepper Motor

Gearbox, motor, coupling, pulley, and bracket are joined at the factory and shipped as a single unit — IRIS part number 01413-001.

Carriage Drive Assembly

The Head Drive Assembly (Stepper Motor and Gearbox) and Components

The head drive assembly is supplied as a unit assembled at the factory and consisting of the stepper motor, gearbox, coupling, pulley, and bracket. If you need to replace any of these components, replace the entire assembly and return the original assembly for credit.

PROCEDURE

Removing the head drive assembly

Tools Required: Ratchet offset kit, two 11/32" ignition-type box wrenches

- 1 Shut down the printer.
- 2 Open the cover and remove both left and right bulkhead covers.
- 3 Release the tension on the carriage band by lowering the tension on the spring on the rocker (idler pulley on left side of printer as you face the printer).
- 4 Slide the band off the drive pulley on the right side of the printer.
- 5 Disconnect the motor lead connector.
- 6 Remove the head drive assembly from the right by removing the three screws that secure the head drive assembly to the bulkhead.
- 7 Lift out the head drive assembly.

Replacing a Drive Pulley

PROCEDURE

Replacing a drive pulley

Tools Required: Ratchet offset kit

- 1 Shut down the printer.
- 2 Open the printer cover and remove both left and right bulkhead covers.
- 3 Loosen the band by lowering the tension on the spring on the rocker (idler pulley).
- 4 Slide the band off the drive pulley on the right side of the printer.
- 5 Loosen the clamp on the drive pulley with a hex driver.
- 6 Remove the drive pulley.

Removing the Carriage Assembly (Print Head Assembly)

PROCEDURE

Removing the carriage assembly>

Tools Required: Ratchet offset kit, two 11/32" ignition-type box wrenches, 7/16" nut driver

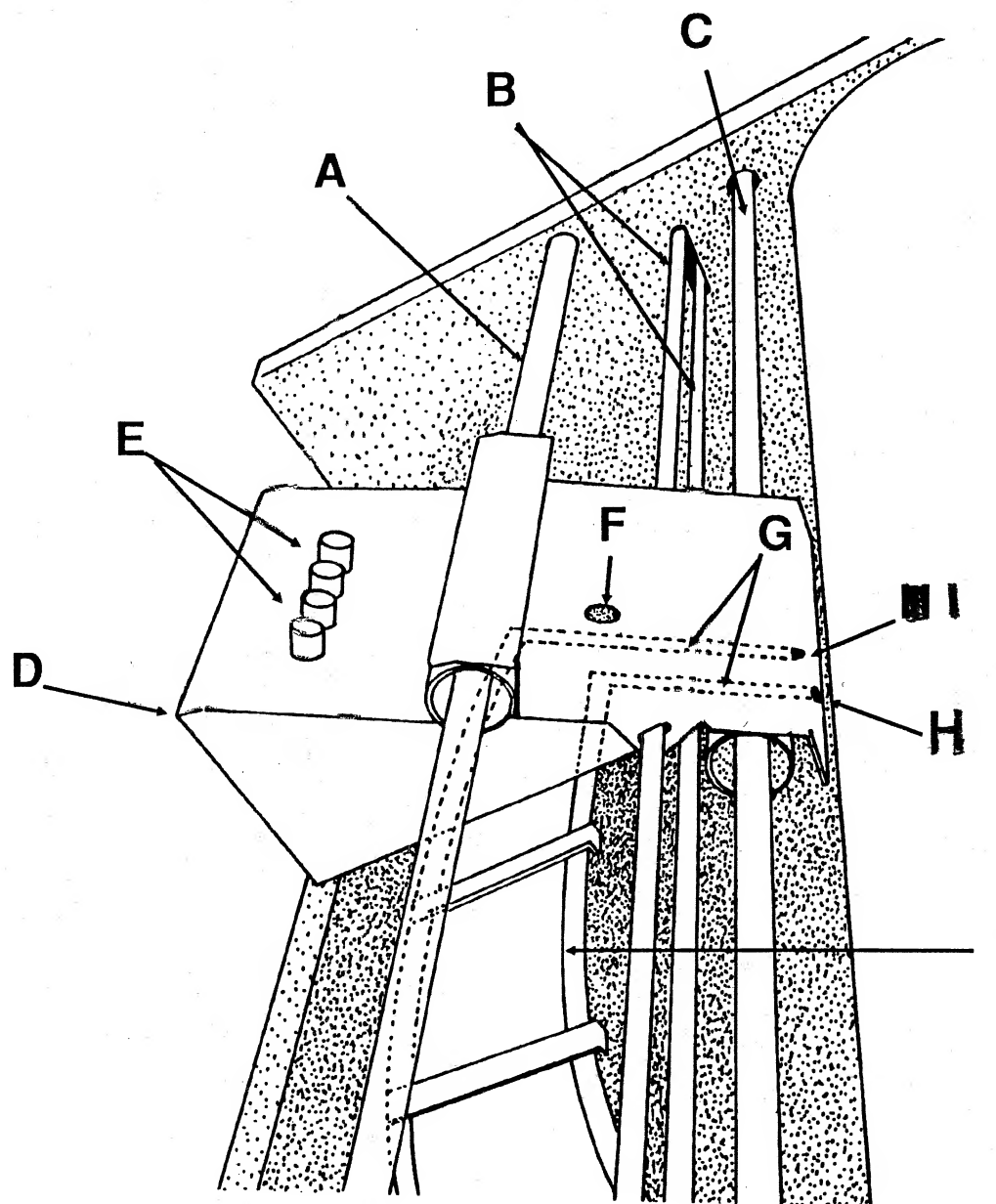
CAUTION: Two people are needed for this procedure.

- 1 Shut down the printer.
- 2 Open the printer cover and remove both left and right bulkhead covers.
- 3 Remove the dust cover ("hat"), ink jets, and deflection assembly.
- 4 Release the tension on the carriage band by loosening the spring on the rocker (idler pulley — on left side of printer). Remove the band completely.
- 5 Loosen the two bolts that secure the carriage rails on the left end (idler pulley side) of the drum until you expose about 3/16" of their threads.
- 6 Disconnect the umbilical, the vacuum hoses, and the ink lines.
- 7 Remove the head drive assembly from the right by removing the three screws that secure the head drive assembly to the bulkhead.
- 8 Remove the bolts from the right side of the rails.
- 9 Remove the screws holding the bulkhead in place.
- 10 With assistance from a second person, lift the rails away from the bulkheads and slide the carriage off the free end.

IDENTIFICATION OF PARTS

Carriage with Head Electronics Assembly

- A Upper Carriage Rail
- B Drive Band
- C Lower Carriage Rail
- D Head Electronics Compartment
- E Vertical Convergence Adjustment Knobs
- F Tunnel for High-Voltage Lead (Upper Deflection Assembly)
- G Vacuum Lines (from Umbilical)
- H Sump Vacuum Port
- I Bib Vacuum Port
- J Umbilical Assembly

**Carriage with Head Electronics Assembly**

Replacing a Carriage Rail

PROCEDURE

Replacing a carriage rail

Tools Required: Ratchet offset kit, two 11/32" ignition-type box wrenches, 7/16" nut driver.

- 1** First follow the procedure for removing the carriage assembly.
- 2** After removing the carriage assembly, remove the screws from the left (idler-pulley) end of the printer one at a time and lift the rail out.
- 3** When you reinstall the rail, be sure that the carriage moves freely through its complete length of travel.

CAUTION: Do not remove the bearing tubes from carriage base. Do not oil the carriage rails. Wipe them clean occasionally with a soft, dry, lint-free cloth.

G

Ink Jet Nozzle Assembly

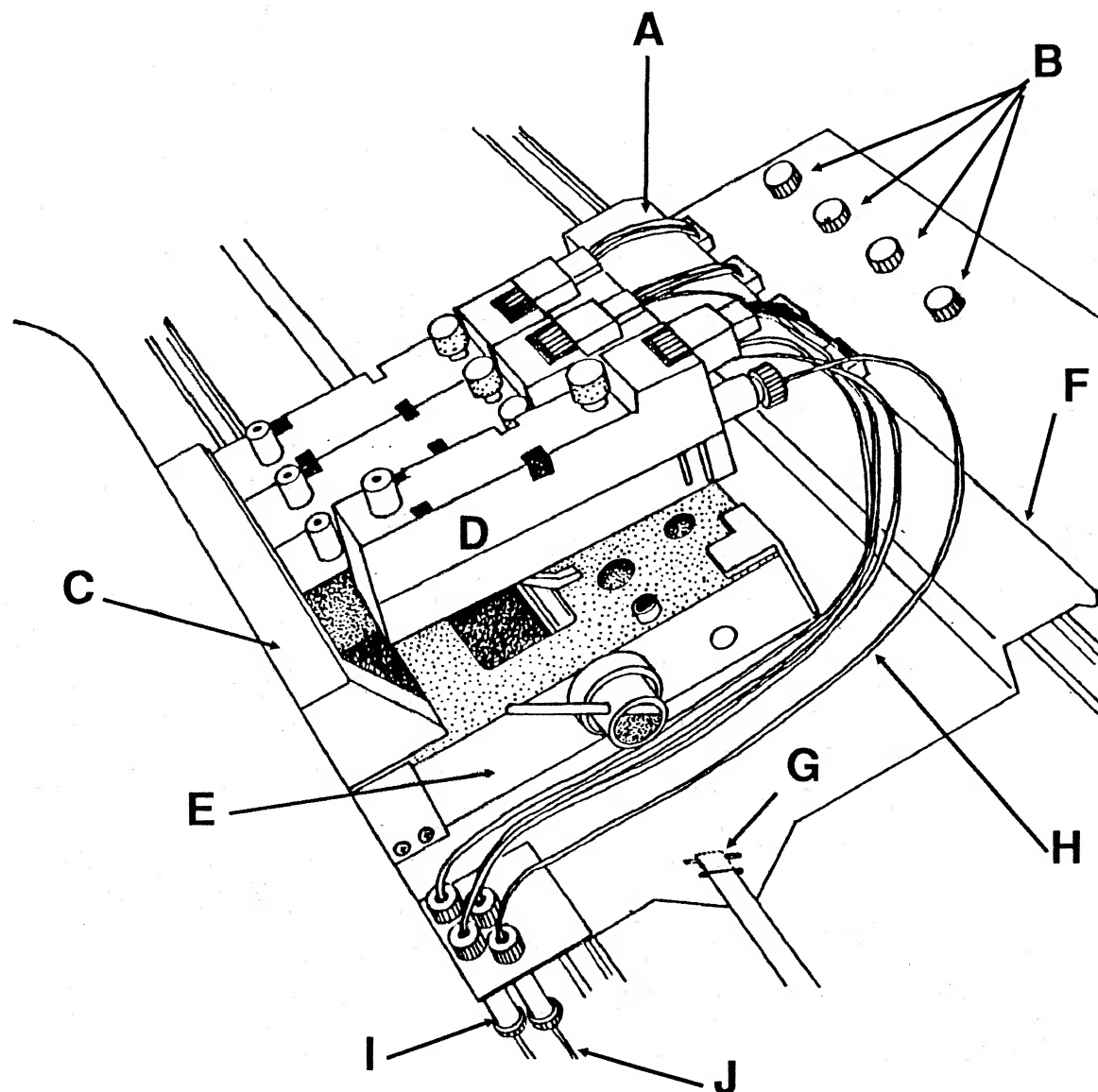
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Attaching a New Long Line (Ink Delivery Line) to the Umbilical	G-3
Replacing Short Lines on the Ink Jet Nozzle Assembly	G-3
Removing/Replacing Carriage Base	G-3

IDENTIFICATION OF PARTS

Ink Jet Nozzles and Base Plate

- A** Nozzle Connect Cable #00979-001
- B** Horizontal Convergence Adjustment Knobs
- C** Deflection Structure #00874-001
- D** Ink Jet Nozzle Assembly . . . #00907-001
- E** Nozzle Base Plate
- F** Carriage Base
- G** Carriage Drive Band Attachment Pin
- H** Short Ink Line #00098-003
- I** "Feed-Through"
- J** Long Ink Line #00098-001
- K** Vertical Convergence Knobs

**Ink Jet Nozzle Assembly
and Base Plate**

Attaching a New Long Line (Ink Delivery Line) to the Umbilical

The long ink delivery lines run from the pump to the carriage assembly — two lines on each side of the umbilical. The lines are attached to the “feed throughs” in the carriage plate. All ink lines are color-coded.

Before you remove or replace an inkline, remove the corresponding ink bottle from the ink pump and insert a coffee stirrer through the septum to prevent leaking from the partially full ink bottle.

Rather than taking the entire umbilical apart to remove a long line, it is preferable to tie-wrap a new ink line to the umbilical. Simply remove the section of the long line to be replaced that goes to the pump and the section that goes to the feed through. Tie-wrap the new long line to the remaining section of the damaged line that is still attached to the umbilical.

Replacing Short Lines on the Ink Jet Nozzle Assembly

The short ink delivery lines run from the top of the “feed throughs” on the carriage base to the ink jet nozzles. Ink lines are color-coded.

To remove and replace a short ink delivery line, disconnect the ink line from the jet and from the feed-through. Insert a new line.

IMPORTANT: Do not overtighten the connection to the ink jet. Hand-tight is sufficient.

Removing/Replacing Carriage Base

PROCEDURE

Removing/replacing the carriage base

Tools Required: Ratchet offset kit

- 1 Shut down the printer.
- 2 Remove the dust cover, ink jet nozzles, and deflection assembly. (See the *Operator's Manual* for detailed procedures.)
- 3 Be sure to cap the ink jet nozzles with the M6 threaded plug (IRIS part number 00385-001) to prevent loss of the O-ring.
- 4 Open the back of the carriage head assembly and disconnect the high-voltage lead from the high-voltage power supply.
- 5 Using a Phillips-head screwdriver, remove the two screws that secure the sub/base plate to the carriage assembly.
- 6 Lift the sub/base plate up gently and pull the high voltage lead through the hole in the carriage assembly.
- 7 There are two O-rings in the underside of the sub/base plate — one insures a seal for suction on the print head assembly and the second insures that ink does not leak into the electronics cavity. Both of these O-rings must be in place when you reinstall the sub/base plate. On later models, the O-ring at the sump port has been replaced by a hollow steel rivet. This rivet should be installed by inserting the smaller end into the vacuum port. A 1/16" bead of silicon sealant is applied to both faces.
- 8 Reverse procedure to reinstall or install new sub/base plate.
- 9 Make sure the head base is aligned parallel to the drum.

H

Drum Pulley Assembly

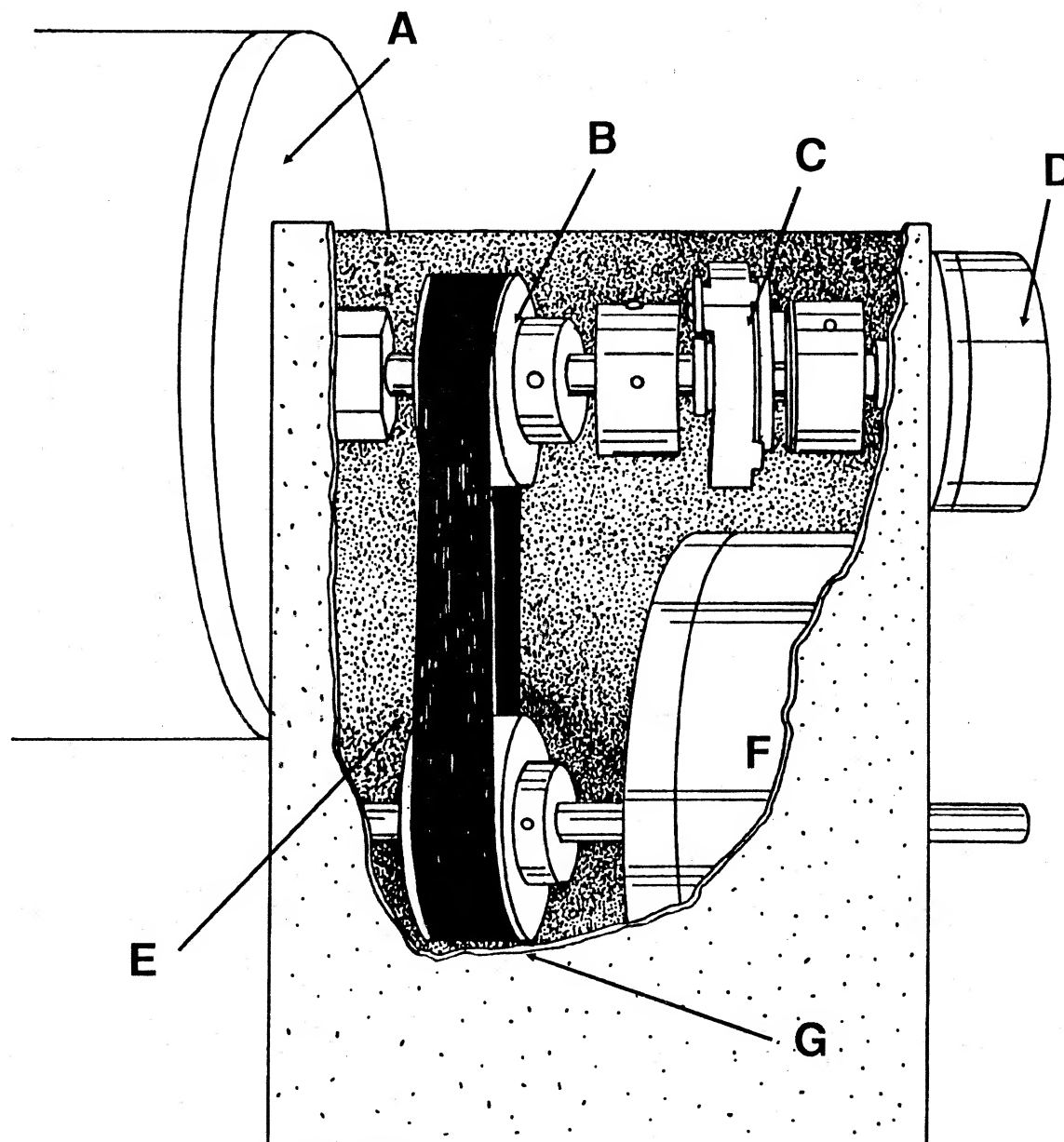
Section Table of Contents

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Adjusting Drum Indexing	H-3
Removing/Replacing the Drum Pulley Assembly	H-4
Removing and Replacing the Drum Drive Belt	H-4

IDENTIFICATION OF PARTS

Drum Encoder Motor Assembly

- A** Drum
- B** Drum Pulley
- C** Encoder/Drum Coupling
- D** Encoder
- E** Drive Belt
- F** Drum Motor
- G** Motor Pulley

**Drum Encoder Motor Assembly**

Removing and Replacing the Drum Encoder

HINT: Whenever you perform a procedure that requires you to remove or replace the drum shaft encoder, leave the coupling on the encoder, turn the drum by hand so that the reference marks are on top, and make a mark with a pencil on both the bulkhead cover and the coupling. This will help you align the encoder.

There are two versions of this procedure. Version B is used for later models on which the encoder is attached to an adapter plate.

PROCEDURE

Removing/replacing the drum encoder (Version A — older models)

Tools Required: Ratchet offset kit, Phillips screw starter

- 1 Shut down the printer.
- 2 Disconnect the data cable to the motor driver board — a flat ribbon cable.
- 3 Remove the circuit board.
- 4 Loosen — but do not remove — the four screws that hold the drive motor in place in order to release tension on the drive belt.
- 5 Loosen the encoder coupling on the drum side.
- 6 Remove the four screws that secure the encoder motor assembly.
- 7 Remove the coupling from the encoder.
- 8 Remove the four screws that retain the encoder. **NOTE:** There is a bushing on the encoder shaft. Be sure that the bushing is placed **on the encoder** when reassembling.
- 9 To reassemble, reverse this procedure.

- 10 After the assembly is in place and aligned, mount the drive belt. Set the tension on the belt by pushing down on the motor and tightening the adjustment screws. The tension on the belt should be sufficient to prevent slippage. Excessive tension may cause the belt to break.

NOTE: Whenever a pulley is reinstalled — or fully exposed during a maintenance or repair procedure — wipe all deposits off the pulley with a clean, dry cloth.

Adjusting Drum Indexing

Adjustment of indexing will be required whenever any changes or adjustments are made to the drum pulley assembly.

Adjusting drum indexing ensures that the first spot in each image raster is placed 0.2 to 0.3 inches below the lower reference (index) mark on the drum.

HINT: Whenever you perform a procedure that requires you to remove or replace the drum shaft encoder, leave the coupling on the encoder, turn the drum by hand so that the reference marks are on top, and make a mark with a pencil on both the bulkhead cover and the coupling. This will help you align the encoder.

PROCEDURE

Adjusting drum indexing

Tools Required: Ratchet offset kit

CAUTION: The printer pause function will stop printer operation for only two minutes. If you are interrupted during this procedure or if you expect an individual adjustment will take longer than two minutes, shut the printer down.

- 1 After reassembling the printer, mount a full-size (24 × 24 inch) piece of paper on the drum and run a grid pattern. (See Section 4 of the *Operator's Manual*.) The first horizontal line of the grid pattern will be placed at the starting point.
- 2 Pause the print run by pressing the Print switch.
- 3 On older models, loosen the coupling on the drum shaft — the coupling on the side facing the drum pulley. On newer models (encoder is attached to adapter plate), loosen the screws that hold the encoder against the adapter plate.

- 4 Hold the encoder in place while you rotate the drum to compensate for the discrepancy, then tighten the coupling (or, on newer models, tighten the screws).
- 5 Resume grid patterns again to check indexing adjustment.

PROCEDURE

**Removing/replacing the drum encoder
(Version B — newer models)**

Tools Required: Ratchet offset kit, Phillips screw starter

- 1 Shut down the printer.
- 2 Loosen — but do not remove — the four screws that hold the drive motor in place in order to release tension on the drive belt.
- 3 Loosen the encoder coupling on the drum side.
- 4 Remove the two screws holding the encoder against the adapter plate.
- 5 To reassemble, reverse this procedure.
- 6 After the assembly is in place and aligned, mount the drive belt. Set the tension on the belt by pushing down on the motor and tightening the adjustment screws. The tension on the belt should be sufficient to prevent slippage. Excessive tension may cause the belt to break.

Removing/Replacing the Drum Pulley Assembly

PROCEDURE

Removing/replacing the drum pulley assembly

Tools Required: Ratchet offset kit

- 1 Shut down the printer.
- 2 Disconnect the data cable to the motor driver board — a flat ribbon cable.
- 3 Remove the circuit board.
- 4 Loosen — but do not remove — the four screws that hold the drive motor in place in order to release tension on the drive belt.
- 5 Loosen the encoder coupling on the drum side.
- 6 Slide drum pulley assembly out.

Removing and Replacing the Drum Drive Belt

PROCEDURE

Removing and replacing the drum drive belt

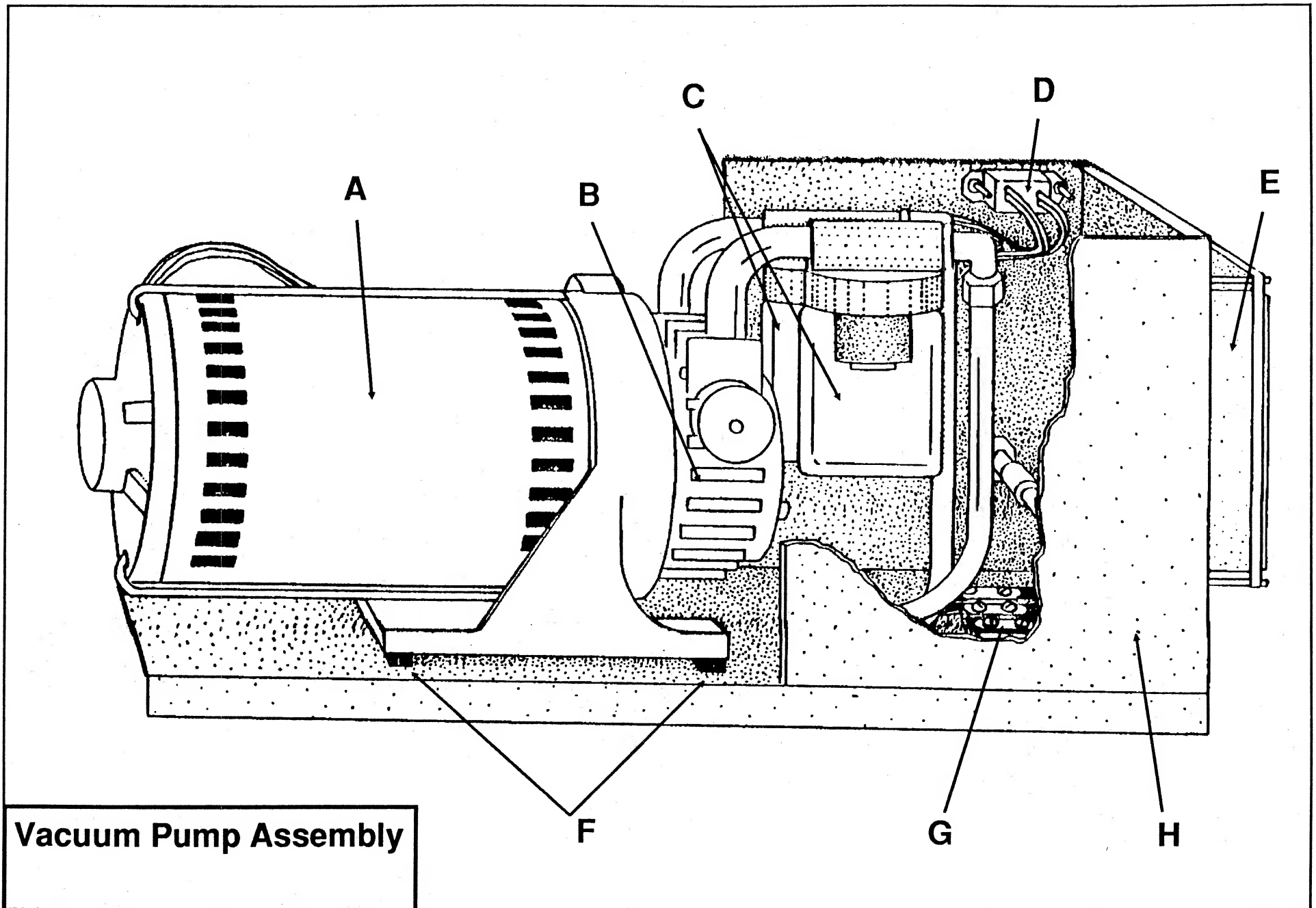
- 1 Remove the drum pulley assembly (see procedure).
- 2 Replace the belt and reinstall.

NOTE: For newer models with coder attached to adapter plate, use encoder removal procedure "B". This will allow you to replace the belt very quickly without removing the drum pulley housing off.

Vacuum Pump and Manifold

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The Vacuum Pump	I-3
Replacing the Vacuum Pump Filters	I-3
Removing/Replacing the Vacuum Pump Fan	I-5
Replacing the Vacuum System Fuse	I-5
Replacing the In-line Vacuum System Filter	I-5
Removing/Replacing the Vacuum Pump Relays	I-6
Replace/Repair Vacuum Manifold	I-6



IDENTIFICATION OF PARTS

Vacuum Pump Assembly

- A** Pump Motor
- B** Vane Assembly
- C** Drip Separators
- D** Switch Relay
- E** Cooling Fan
- F** Rubber Shock Mounts
- G** Terminal Block
- H** Motor Start Relay (mounted on base)

The Vacuum Pump

The vacuum pump is mounted on the floor plate of the printer. You can access the vacuum pump by opening the left rear door of the printer. The pump is secured by four screws. Shut down the printer and remove the vacuum pump in its housing from the printer before performing any of the replacement and repair procedures in this section.

To expose the pump motor and gain access to the motor AC switch relay, start relay, and other vacuum pump components, remove the four screws that secure the housing to the base of the unit. Remove the cover.

Repairs other than those described here must be performed at the factory.

Replacing the Vacuum Pump Filters

Tools Required: Ratchet offset kit, slip joint wrench

Two drip separators are mounted in line with the vacuum and pressure lines of the vacuum pump. Porous metal filters mounted in the line trap waste ink and deposit that ink in the bottles. The bottles can be unscrewed, removed, and emptied. The filters can be removed and cleaned or replaced.

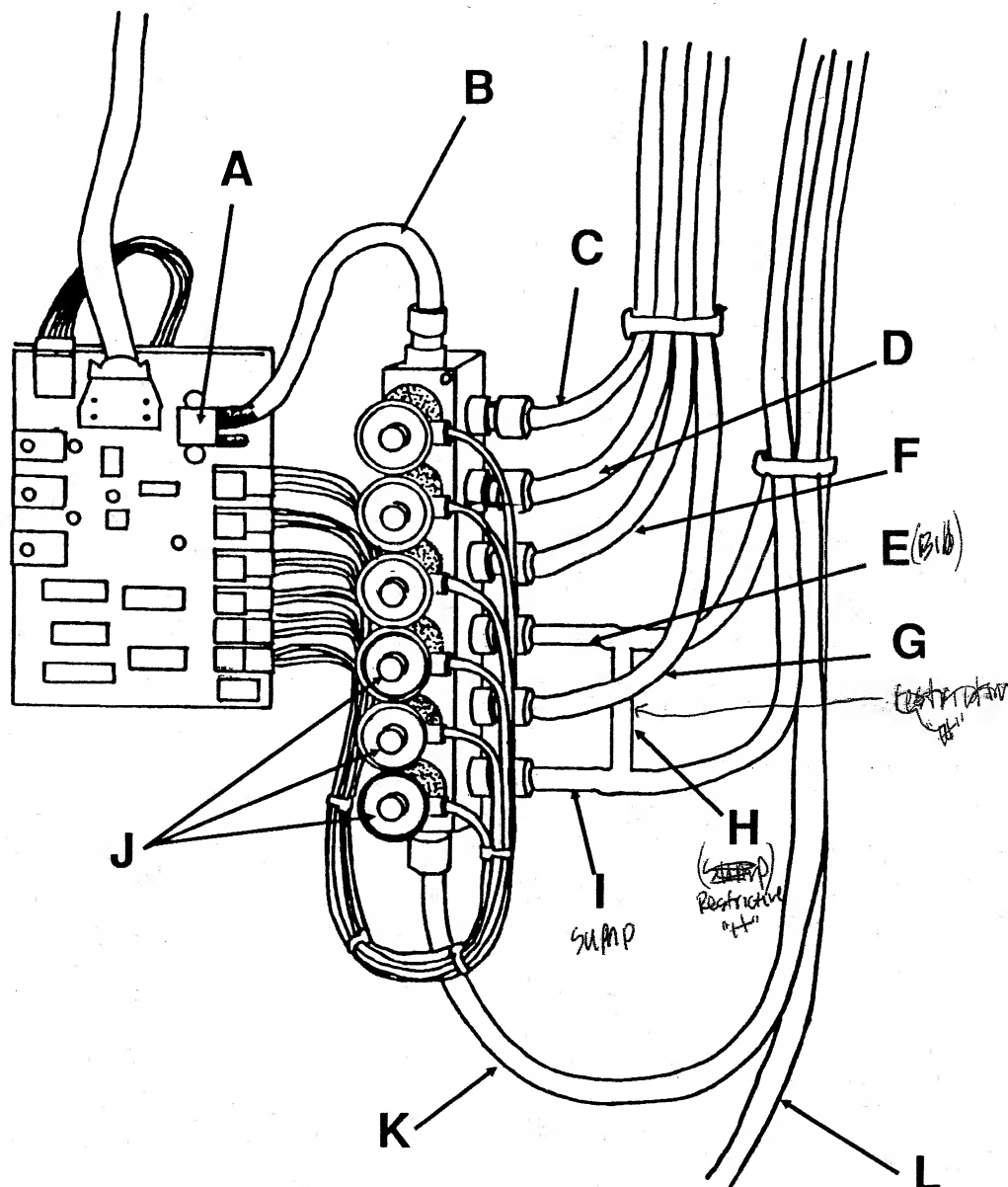
Waste ink reaches the pump only if there has been a failure in the waste ink disposal system. Fix the failure before replacing the vacuum pump filters. If either filter shows discoloration from ink, the pump will have to be replaced.

NOTE: Proper assembly of the vacuum fittings (eight each in the vacuum manifold assembly, two above the dump reservoir, and one below the dump reservoir) is very important for proper operation of the Waste Ink Disposal System. Overtightening a fitting restricts flow. Insufficient tightening of a fitting allows leaks. To assemble a fitting, push the tubing into the fitting and tighten the nut 2 1/2 full turns.

IDENTIFICATION OF PARTS

Vacuum Manifold

- A Vacuum Transducer
- B Vacuum Line from Manifold to Transducer
- C Vacuum Line from Manifold to High-Voltage Electrode
- D Vacuum Line from Manifold to Target Block
- E Vacuum Line from Manifold to Bib
- F Vacuum Line from Manifold to Lower Deflection Assembly
- G Vacuum Line from Manifold to Nozzle Tips
- H Restrictive Joiner
- I Vacuum Line from Manifold to Sump
- J Solenoid to Open/Close Vacuum Valves
- K Vacuum Line from Separator to Manifold
- L Vacuum Line from Pump to Separator

**Vacuum Manifold**

Removing/Replacing the Vacuum Pump Fan

Tools Required: Ratchet offset kit

To remove the vacuum pump fan, disconnect the electrical lead from the terminal strip and remove the four screws that secure the fan to the housing.

Replacing the Vacuum System Fuse

A 5 Amp fuse is located under a screw cap in the front of the vacuum pump housing. This fuse can be reached by opening the left front door of the printer.

Replacing the In-line Vacuum System Filter

A small in-line filter (IRIS part number 00408-001) is located next to the waste ink separator in the vacuum line running from the separator to the waste ink manifold.

This filter should be checked every week or when emptying the waste bottle. If ink ever gets as far as this filter, it would be an indication either that the separator is not working or that the dump solenoid is not opening after a print cycle.

Removing/Replacing the Vacuum Pump Relays

There are two relays within the vacuum pump. The smaller relay, mounted on the side of the vacuum enclosure, is the switching relay. When this is energized, the pump should start — with 115 volts AC present.

The other, larger relay is mounted on the base and is used to engage the start windings in the vacuum motor. If, when the switching relay is energized, the motor hums or vibrates but does not come up to speed, the likely culprit is the motor start relay. A defective motor could, however, manifest the same symptom.

The leads on the relays are push-ons and are easily removed. These can be loosened and the leads disconnected. Note the location of the corresponding connectors before disconnecting the leads.

Replace/Repair Vacuum Manifold

The vacuum manifold provides vacuum to the bib, the sump, the target block, the upper deflection assembly, the lower deflection assembly, and the ink jet nozzles.

Six solenoids, each controlled independently by the solenoid driver board, control vacuum to these six different points on the printer.

The vacuum manifold is accessible by opening the front doors of the printer and removing the two screws that secure it to the printer frame.

If you remove the manifold, be sure to label all the vacuum lines as you disconnect them in order to ensure correct reconnection.

J

Waste Ink Disposal System

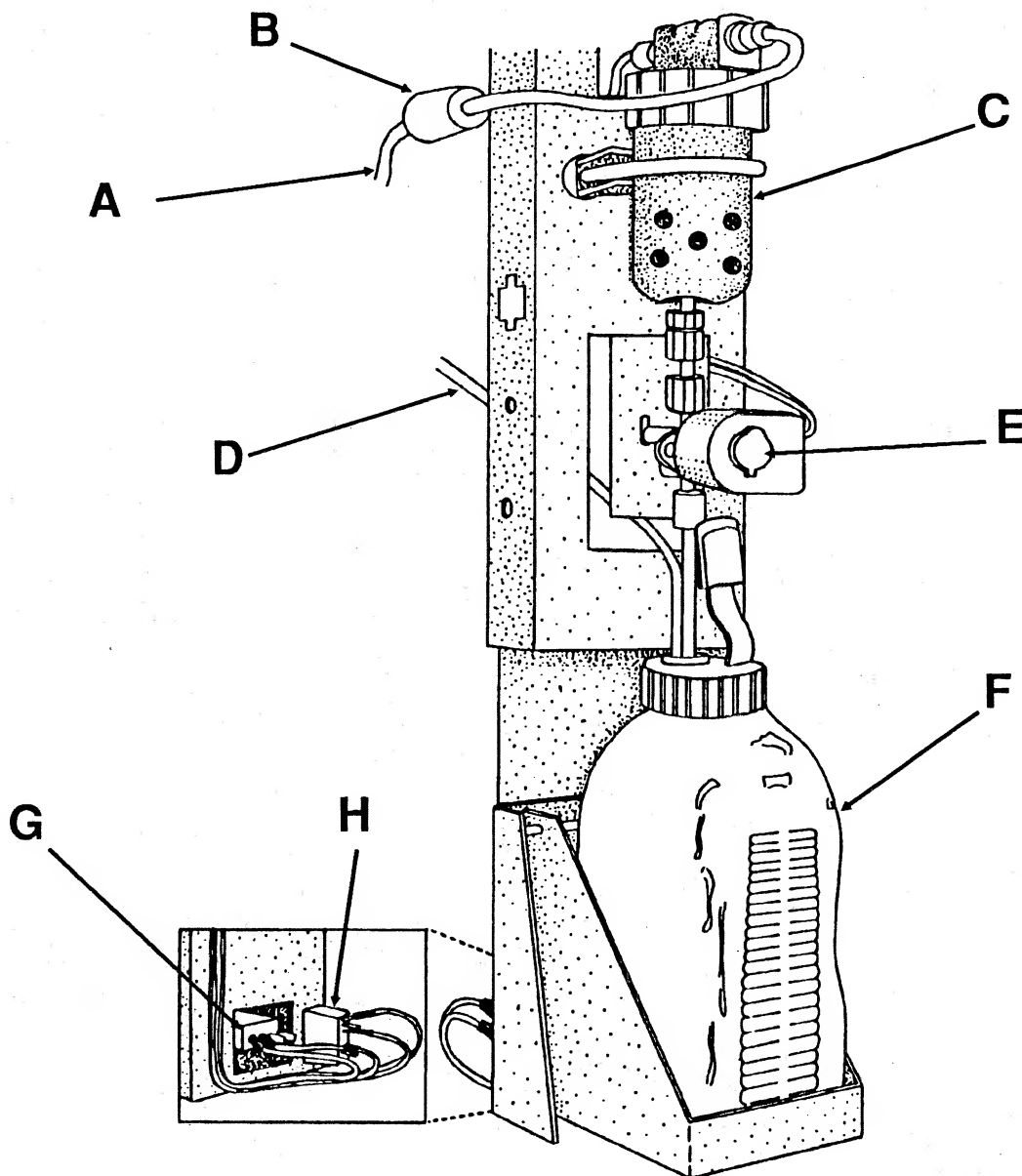
Section Table of Contents

Replacing the Waste Ink Bottle	J-3
Replacing the Waste-ink Separator	J-3
Removing/Replacing the Waste-ink Solenoid	J-3

IDENTIFICATION OF PARTS

Waste Ink Disposal System

- A Vacuum Line from Vacuum Pump
- B Disposable Filter #00408-001
- C Rework Filter #00366-001
- D Drain Line from Ink Pump Tray
- E Dump Solenoid #00177-002
- F Waste Bottle
- G Bottle Missing Switch
- H Bottle Full Switch



**Waste Ink Disposal
System**

Replacing the Waste Ink Bottle

The waste ink bottle sits below the waste ink solenoid in a pivoting housing. When the waste ink bottle is full, the housing pivots forward and trips a switch that inhibits printing CHECK and generates a "WASTE INK BOTTLE FULL" message on control panel.

The bottle sits on a second switch in the base of the housing. Removing the bottle inhibits printing and generates a "WASTE BOTTLE MISSING" message on the control panel when the printer is on.

Replacing the Waste-ink Separator

During printing, the waste ink is separated from the air in the separator located above the waste-ink solenoid. When the suction is shut down after a print run, the solenoid opens and the waste ink drains into the waste ink bottle.

The waste ink separator consists of a vessel, a dump valve, a bottle to collect the waste ink collected during the print run, and a protective housing.

PROCEDURE

Removing/replacing waste-ink separator

Tools Required: 7/16" and 1/2" open-ended wrenches

- 1 Remove the separator assembly from the printer.
 - 2 Then unscrew the protective housing and remove the collector jar.
-

Removing/Replacing the Waste-ink Solenoid

The waste ink solenoid is located in a green housing below the vessel that collects the waste ink. The waste ink solenoid allows waste ink to flow from the waste ink separator into the waste ink bottle at the end of a print run. The solenoid is normally closed.

The waste ink solenoid is accessible by opening the right front door of the printer. If this unit fails, the entire green unit is replaced.

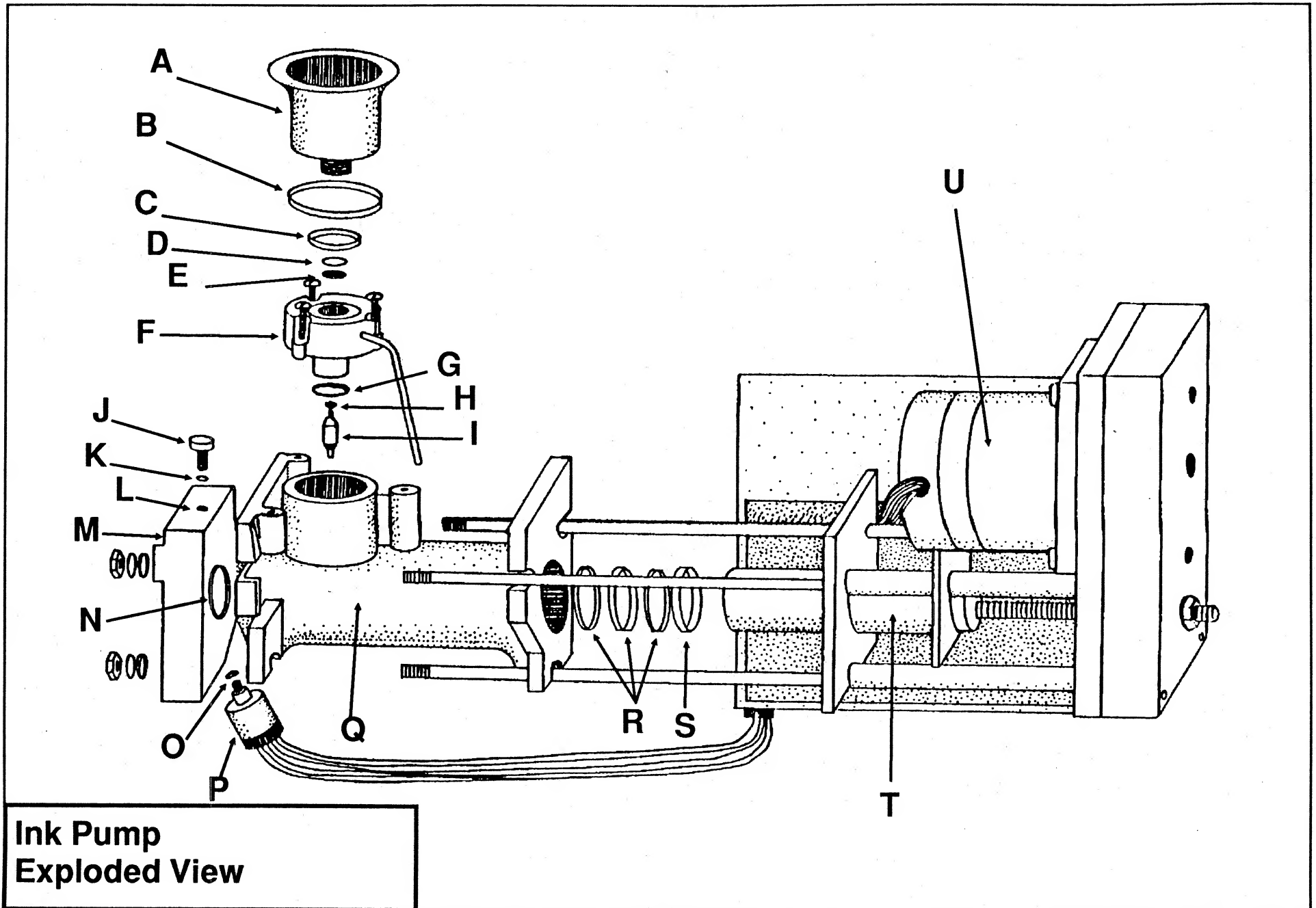
NOTE: The connections above and below the dump valve are designed to be hand-tightened. (On older models of the printer, there are two connections. On new models, there is only one.) If the tubing is **metal**, hand tighten with approximately 25 to 30 inch-pounds of force. If the tubing is **plastic**, hand-tighten to approximately 9 to 10 inch-pounds of force.

K

Ink Pumps

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Removing/Replacing the Transducer	K-4
Removing/Replacing the PC Board	K-4
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**Ink Pump
Exploded View**

IDENTIFICATION OF PARTS

Ink Pump

Exploded View

A	Bottle Holder/Funnel	#00589-001
B	O-Ring	#00034-020
C	O-Ring	#00034-013
D	O-Ring	#00034-001
E	Filter	#01293-001
F	Adapter Funnel	#00218-001
G	O-Ring	#00034-012
H	O-Ring	#00034-006
I	Float	#00373-001
J	Plug (M66)	#00385-001
K	O-Ring	#00034-003
L	Ink Line Port	
M	Transducer Block	#00588-001
N	O-Ring	#00034-017
O	O-Ring	#00034-009
P	Transducer	#00559-001
Q	Pump Body	#00293-001
R	Piston Seal	#00430-001
S	Seal Retainer	#00303-001
T	Piston Assembly	#01020-001
U	Stepper Motor	#01037-001

Removing/Replacing the Ink Pump Float

Removal and replacement of the ink pump float can be performed with the ink pump installed in the printer. If several maintenance procedures are to be performed on the ink pumps, it is advisable to remove the ink pump assembly for greater ease of access.

PROCEDURE

Removing/replacing the Ink pump float

Tools Required: Ratchet offset kit, tweezers, flashlight, lint-free cloth

- 1 Remove the ink bottle. Place a straw or coffee stirrer through the septum of the ink bottle while it is out of the printer. Inserting the straw relieves any pressure (e.g., changes in atmospheric pressure) that might cause the ink to leak out of the bottle.
- 2 Remove the bottle holder and note the two O-rings under it.
- 3 Below the funnel adapter, there is another O-ring and a smaller O-ring on the float itself. Remove both O-rings and the float from the cavity.
- 4 Sop up any ink in the cavity with a soft, lint-free cloth.
- 5 When replacing with a new float, be sure the float sits in the center hole in the base. Inspect the smaller O-ring for dust, lint, etc. (A very small speck of foreign matter will prevent the pump from reaching correct operating pressure.) This small O-ring should be placed on the new float before the new float is installed.
- 6 Replace the two O-rings. The larger O-ring will sit on a shoulder in the cavity.

- 7 Center the float so that when you place the funnel adapter gently over the float chamber, **the float will fit into the funnel adapter.** If there is a gap between the funnel adapter and the float chamber, the float is not properly centered. Remove the funnel adapter, center the float, and try again.

- 8 **When replacing the filter in the funnel adapter, the screen (coarse) side of the filter should face down, toward the float.**

- 9 Replace the O-rings and insert the bottle holder.

NOTE: When you are not using an ink pump, seal the ink-line port with a plug — IRIS part number 385-001 — and replace the bottle holder cover to keep ink from drying up inside the pump.

Replacement of ink pump rings and pistons is a factory procedure.

Removing/Replacing the Transducer

Use the following procedure if it becomes necessary to remove an ink pump transducer.

PROCEDURE

Removing/replacing an Ink pump transducer

Tools Required: Open-end wrench

- 1 Shut down the printer.
- 2 Disconnect the transducer cable from the PC board.
- 3 Using an open-end wrench, turn the transducer counterclockwise and remove it from the pump block.
- 4 Verify the integrity of the O-ring. Replace the O-ring if there is evidence of damage or blemish.
- 5 Install the new transducer.

Removing/Replacing the PC Board

PROCEDURE

Removing/replacing the Ink pump PC board

Tools Required: Ratchet offset kit

- 1 Shut down the printer and follow the separate Procedure for removing an ink pump assembly from the printer.
- 2 Remove the stepper motor cable and the transducer cable from the board.
- 3 Remove the three Phillips screws that secure the board. Note the nylon stand-offs that are used to separate the board from the gearbox.
- 4 When installing the new board, observe the small tab from the piston plate. This tab should fit into slot in the board between the limit switches.
- 5 After the board is installed, perform the appropriate checks from the Acceptance Test Procedure (Section P).

Removing an Ink Pump Assembly from the Printer

PROCEDURE

Removing/replacing an Ink pump assembly

Tools Required: Ratchet offset kit

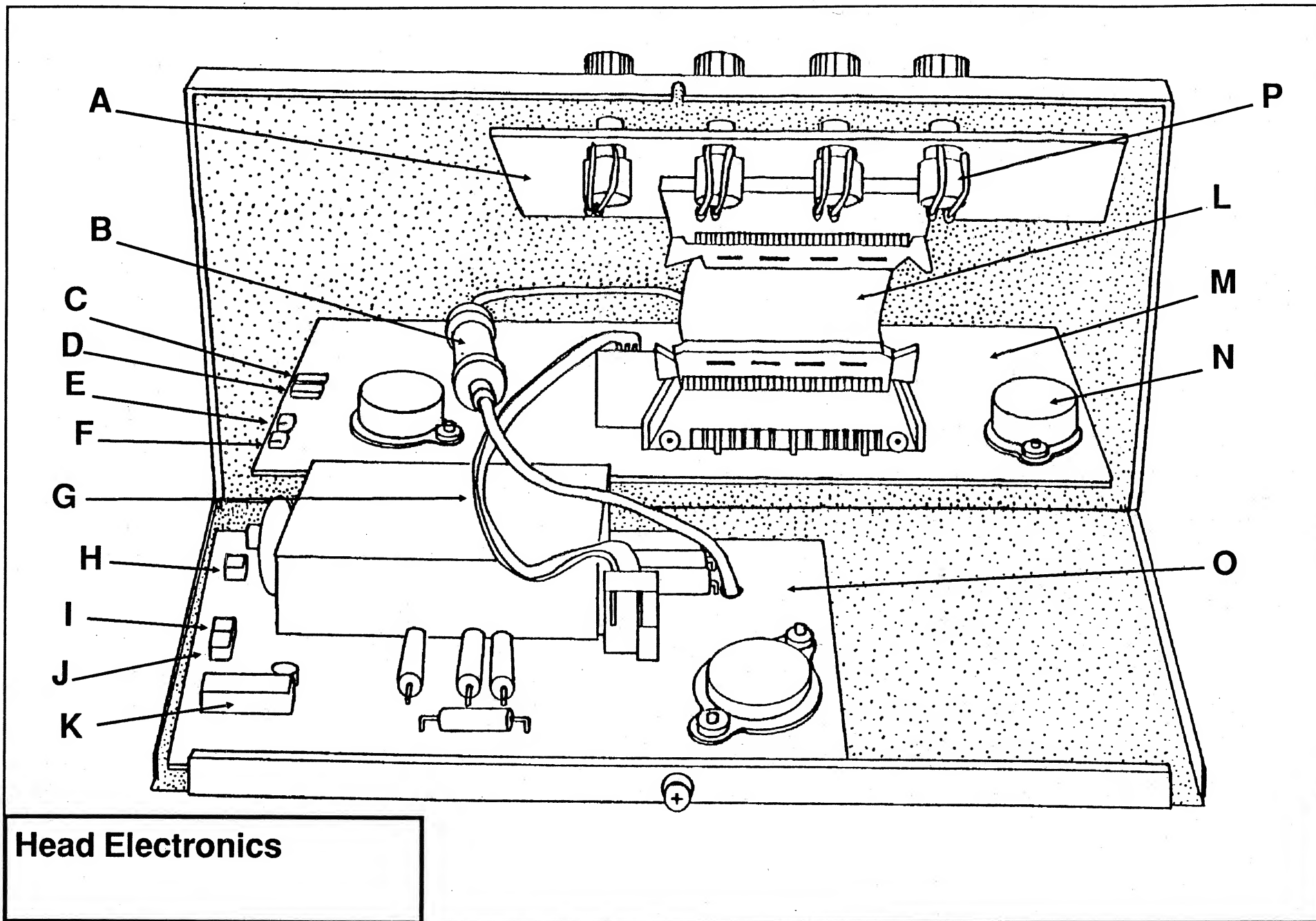
- 1 Shut down the printer.
- 2 Remove the four ink bottles.
- 3 Remove the two Phillips-head screws that secure the cover of the ink pump assembly.
- 4 Disconnect the ink lines at the pump end.
- 5 Disconnect the data cable and the power cable. Note the orientation of the data cable connector when you disconnect it. This connector must be reconnected in the same orientation.
- 6 Lift the ink pump assembly out.
- 7 When you reinstall the ink pump assembly in the printer, be sure that all cables and ink lines are connected and that there are no kinks in the ink lines and that the lines are not pinched.
- 8 When you replace the cover, make sure the pump LEDs and the purge buttons are centered in their access holes in the cover.

L

Electronics

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The Machine Control Microprocessor (MCP)	L-4
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Head Electronics

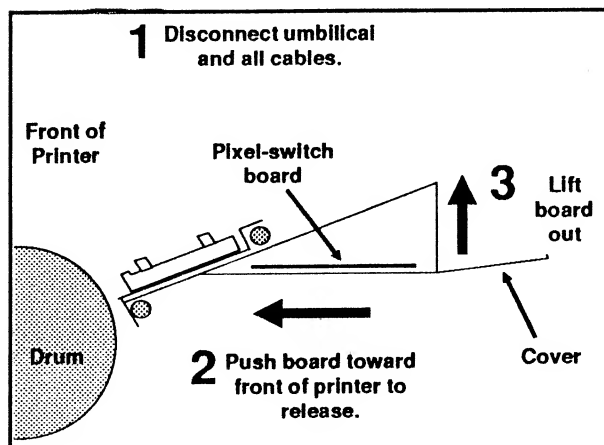
IDENTIFICATION OF PARTS

Head Electronics

- A** Jet Connect Board
- B** High-Voltage Lead to Deflection Structure
- C** R17
- D** R18
- E** TP1
- F** TP2
- G** 4-Wire Cable
- H** TP1
- I** TP3
- J** TP2
- K** R22
- L** Jumper Cable
- M** Pixel Switch Board
- N** U7
- O** High-Voltage Board
- P** Horizontal Convergence Potentiometer

Removing and Replacing the Control Panel

The control panel is mounted to the left bulk-head by two screws. To remove the control panel, turn off the printer, remove the two screws and disconnect the cable harness.



Removing the pixel-switch board when standing in front of the printer.

Head Electronics

The head electronics consist of a pixel-switch board, a jet connect card, and a high-voltage board.

You can access the head electronics by loosening the screw that secures the door on the rear of the print head assembly and swinging the door down.

The high-voltage board is mounted to the door of the print head assembly.

PROCEDURE

Removing/replacing the high-voltage board

Tools Required: Ratchet offset kit

- 1** Open the door on the rear of the print head assembly.
- 2** Disconnect the ribbon cable and the high voltage lead.
- 3** Lift out the door and place the door on a work surface. (The hinge for the door is simply two tabs that fit into corresponding slots. Lift the door and pull it away from the assembly.)
- 4** Remove the four screws that secure the high-voltage board to the door.
- 5** Remove the high-voltage board.

PROCEDURE

Removing/replacing the pixel-switch board

Tools Required: Ratchet offset kit

- 1** Open the door on the rear of the print head assembly.
- 2** Disconnect the umbilical.

- 3 Disconnect the jumper cable (N) between the pixel switch board and the jet connect board.
- 4 Disconnect the 4-wire cable (O) to the high-voltage module.
- 5 Separate the high-voltage lead (M). (At this point, you may choose to remove the access door to give yourself easier access to the pixel-switch board.
- 6 Slide the pixel-switch board toward the drum end of the print head assembly, then lift the edge of the board up so that the umbilical connector clears the access hole in the chassis.
- 7 Lift the board out.

PROCEDURE

Removing/replacing the jet connect board**Tools Required:** Ratchet offset kit

- 1 Loosen the Allen screws that hold the horizontal convergence knobs to their shafts and remove the knobs.
- 2 Open the door on the rear of the print head assembly.
- 3 Disconnect the ribbon cable to the pixel-switch board.
- 4 Remove the two Phillips-head screws that secure the board.
- 5 Lift the jet connect board out.

The Upper Control Board

The upper control board controls the ink pump boards and the drum drive mechanisms.

PROCEDURE

Removing/replacing the upper control board**Tools Required:** Ratchet offset kit

- 1 Shut down the printer.
- 2 Remove the right-side bulkhead cover.
- 3 Remove the cables from the upper control board. Note the location and orientation of the cables.
- 4 Remove the two Phillips screws that secure the upper section of the board.
- 5 Lift out the bottom section of the board from its slots and remove the board.
- 6 When reinstalling the board, refer to the Acceptance Test Procedures (Section P) for electrical adjustments.

The Machine Control Microprocessor (MCP)

The Machine Control Microprocessor contains computer electronics and a power supply for the electronics. The MCP cabinet is an AT-type chassis that contains processing boards of IRIS design and manufacture.

In addition to the main processing board ("mother board"), the MCP of all IRIS 3024 printers will contain at least two other boards that are plugged into the main board: (1) the Jet Offset RAM board and (2) an interface board for magnetic tape or host-system input.

PROCEDURE

Removing/replacing the Interface board or Jet Offset RAM board

- 1 Shut down the printer.
- 2 To access the MCP, open the left front door of the printer and swing the MCP cabinet out on its hinge. (See Page E-2.)
- 3 To open the MCP, remove the five screws in the rear of the cabinet and slide the metal cover forward and off the chassis.
- 4 Disconnect the cable connected to the board.
- 5 Remove the screw that secures the board to the chassis.
- 6 Very carefully rock the board back and forth until it slides out of its slots.

Be careful not to touch or damage the components mounted on the boards. Use anti-static precautions.

PROCEDURE

Removing the main processing board

Tools Required: Ratchet offset kit

WARNING: Turning on the printer with the upper control board cable and the umbilical ribbon cable connected in the wrong orientation can cause serious damage to printer electronics. Observe the position and orientation of all cables and record that information before you disconnect them.

- 1 Shut down the printer and remove the interface and jet offset RAM boards according to the previous procedure.
- 2 Disconnect the cable to the reset button (W5).
- 3 Disconnect the power cables (J8 and J9).
- 4 Disconnect the target block ribbon cable (J3).
- 5 Disconnect the display electronics cable (J4).
- 6 Disconnect the upper control board ribbon cable (J2). NOTE: Pin 1 of the ribbon cable is **up**.
- 7 Disconnect the umbilical ribbon cable. NOTE: Pin one of the cable is **down**.
- 8 Remove the two screws.
- 9 Pull the lower edge of the board toward you — only enough to pull the board off the plastic connectors.
- 10 Pull the board down out of its slot and remove it. Avoid touching the components on the board.

AVOID flexing the main processing board. Flexing may damage the circuitry.

To remove the MCP, disconnect all cables coming in through the rear of the MCP and lift the unit vertically off its hinge.

Target Block Amplifier Module

The target block amplifier module is located behind and below the control panel. (See illustration in Section F, "Control Panel and Interlock System.")

PROCEDURE

Removing/replacing the target block amplifier module

Tools Required: Ratchet offset kit

- 1 Shut down the printer.
- 2 Open the hood and remove the left bulkhead cover.
- 3 Disconnect the cables to J1 and J2.
- 4 Remove the four screws and lift the module out.

Solenoid Driver Board

The solenoid driver board is located next to the vacuum manifold behind the right front panel. (See illustration in Section I, "Vacuum Manifold.")

PROCEDURE

Removing/replacing the solenoid driver board

Tools Required: Ratchet offset kit

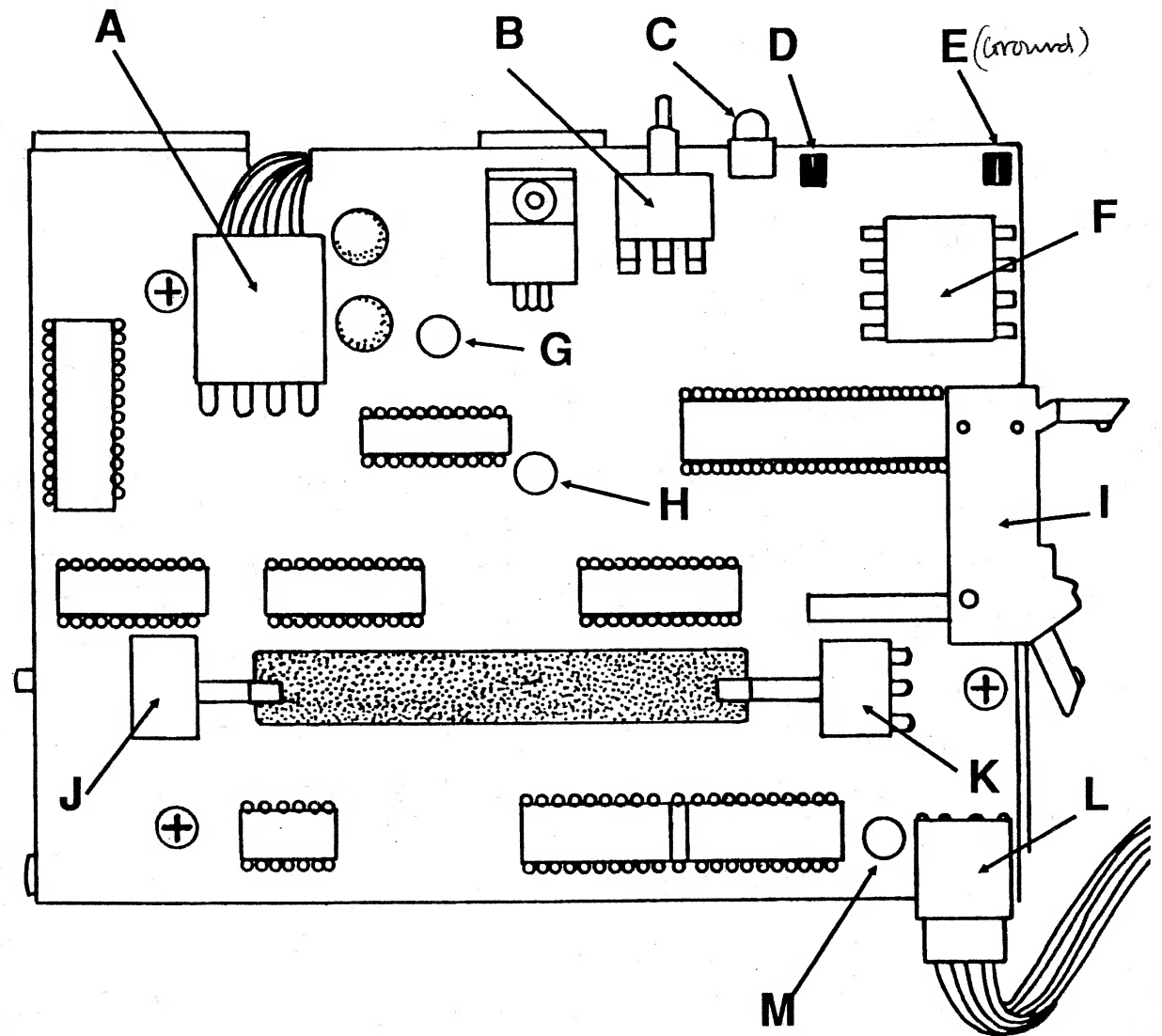
- 1 Shut down the printer.
- 2 Open the right front panel.
- 3 Disconnect the solenoid cables (J1 through J8).
- 4 Disconnect the vacuum line from P2.
- 5 Remove the four screws and lift the module out.

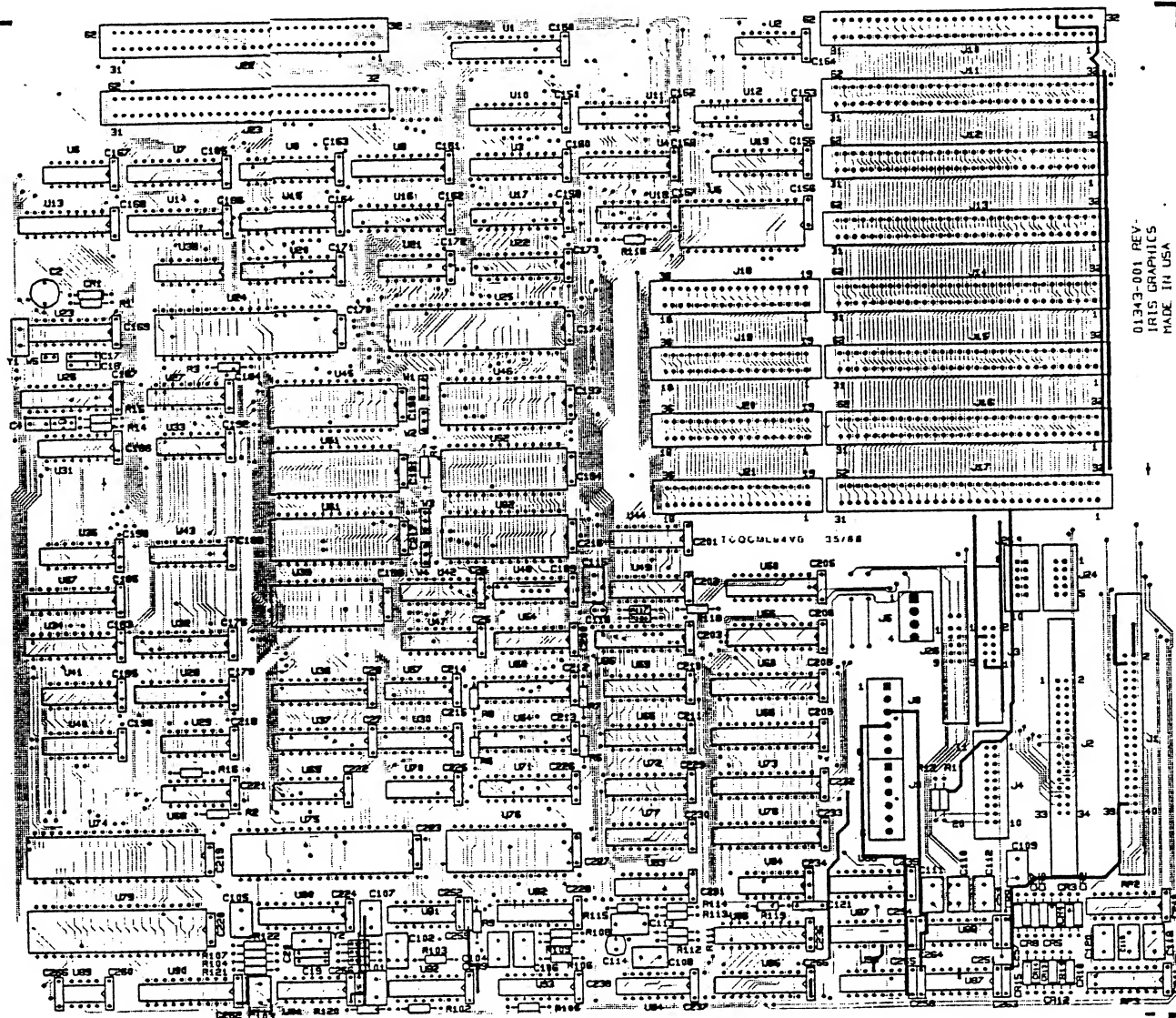
IDENTIFICATION OF PARTS

Ink Pump Printed Circuit Board

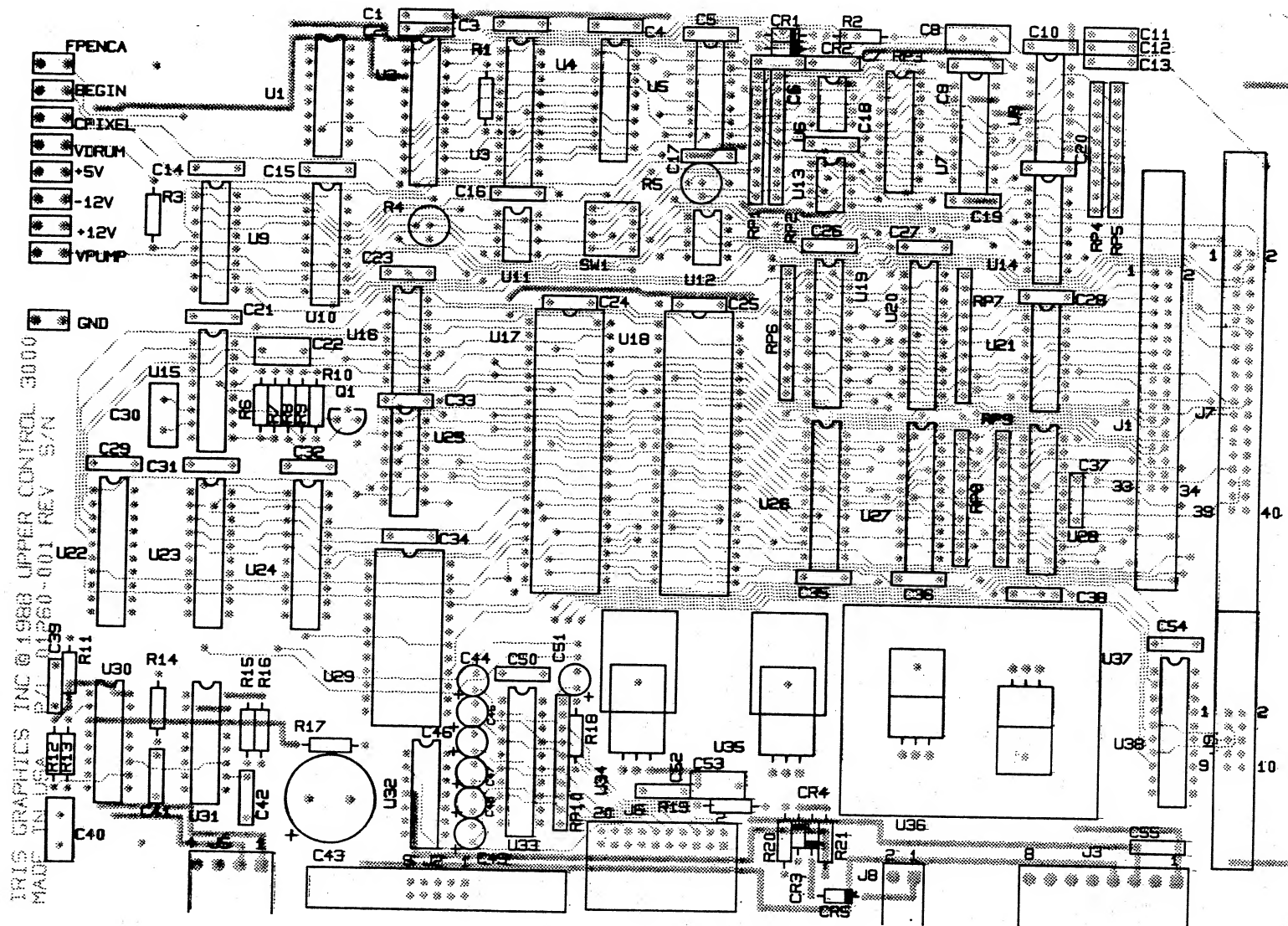
- A** Connector for Stepper Motor
- B** Purge Switch
- C** LED Indicator
- D** TP1
- E** TP2
- F** Power Cable Connector
- G** R6 — 5-Volt Gain
- H** R14 — Frequency Output
- I** Control Cable Connector
- J** Home (Refill Stroke) Limit Switch
- K** Forward (Pump Stroke) Limit Switch
- L** Transducer Cable Connector
- M** R32 — Transducer Null

NOTE: Refer to page P-2, steps 2.a. through 2.c. for adjustment procedure.

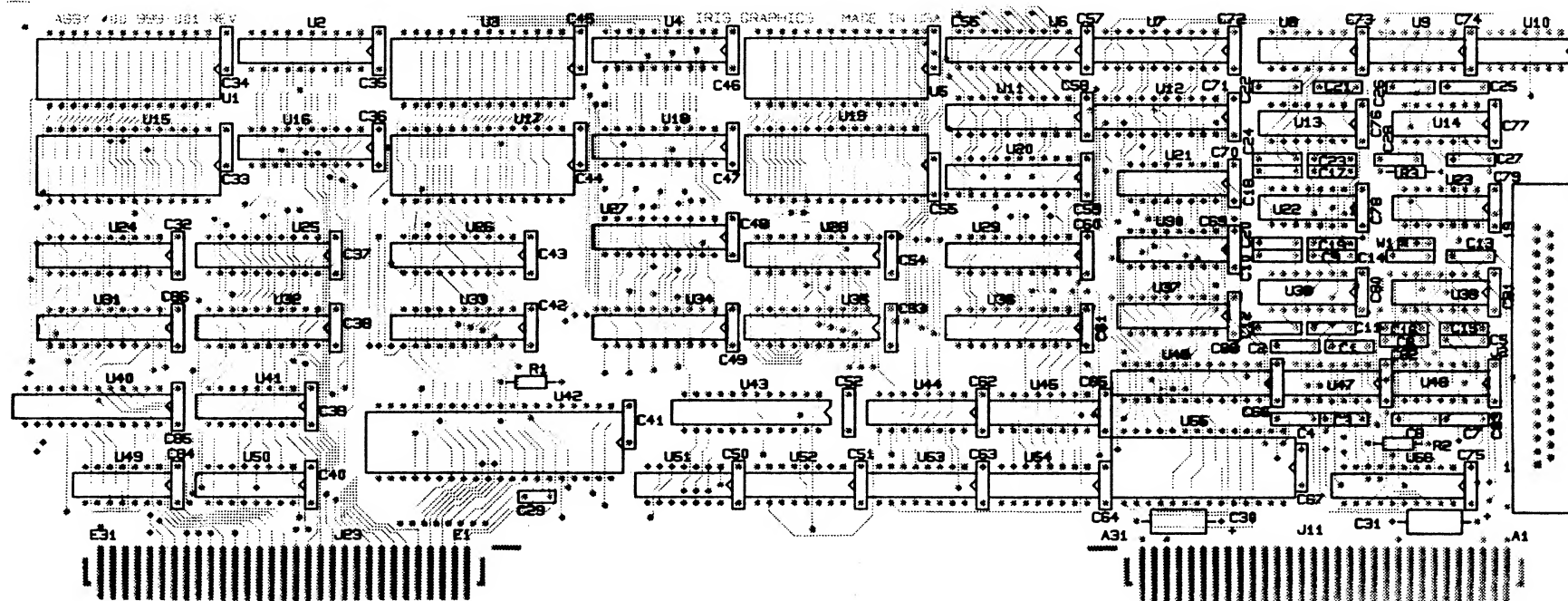
**Ink Pump Printed Circuit Board**



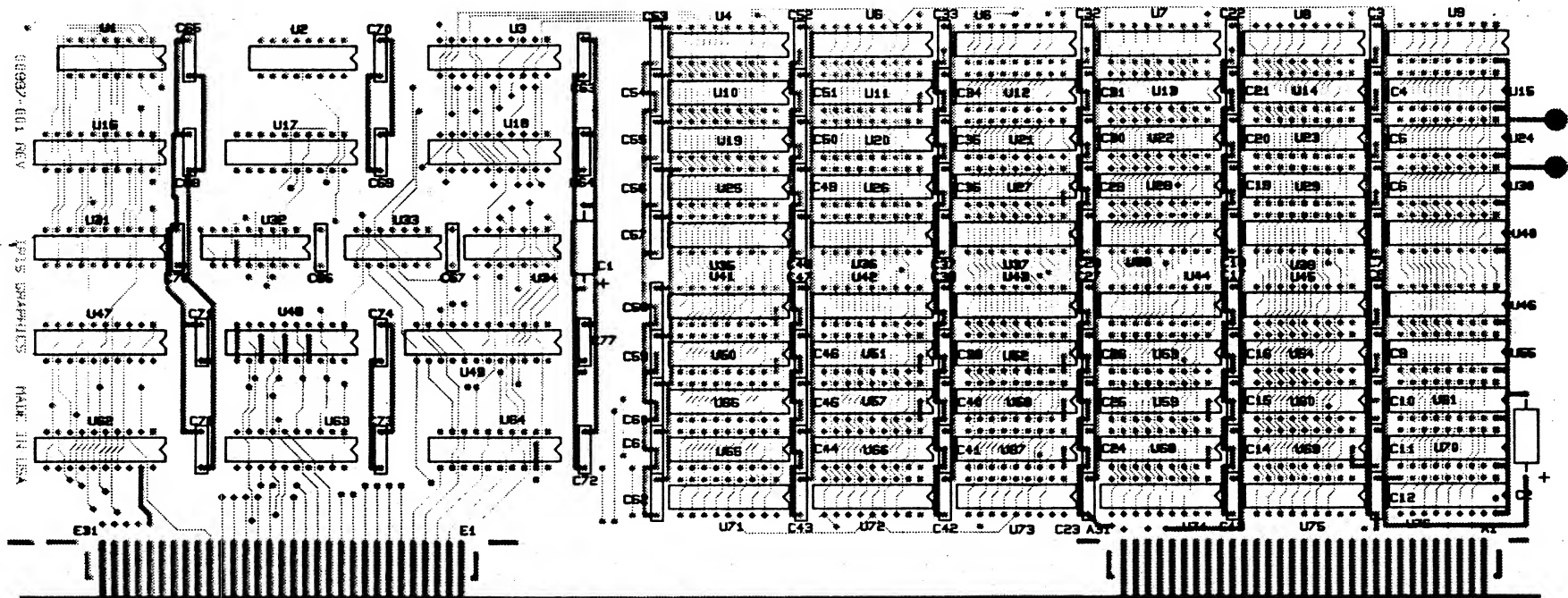
Machine Control Processor



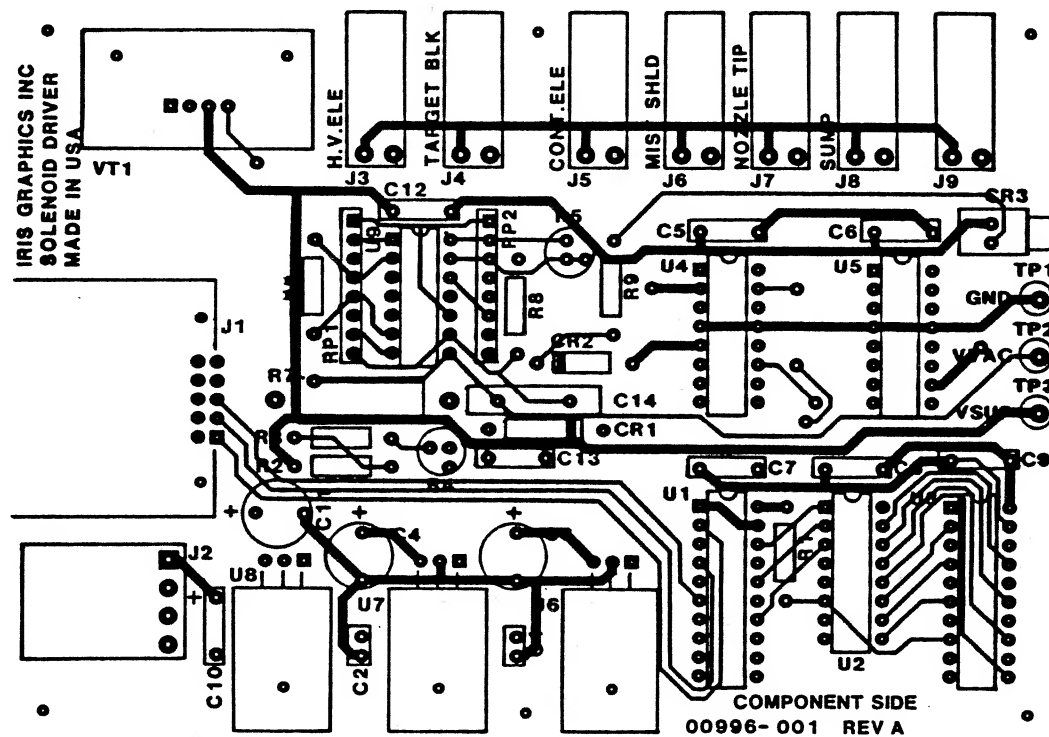
Upper Control Board



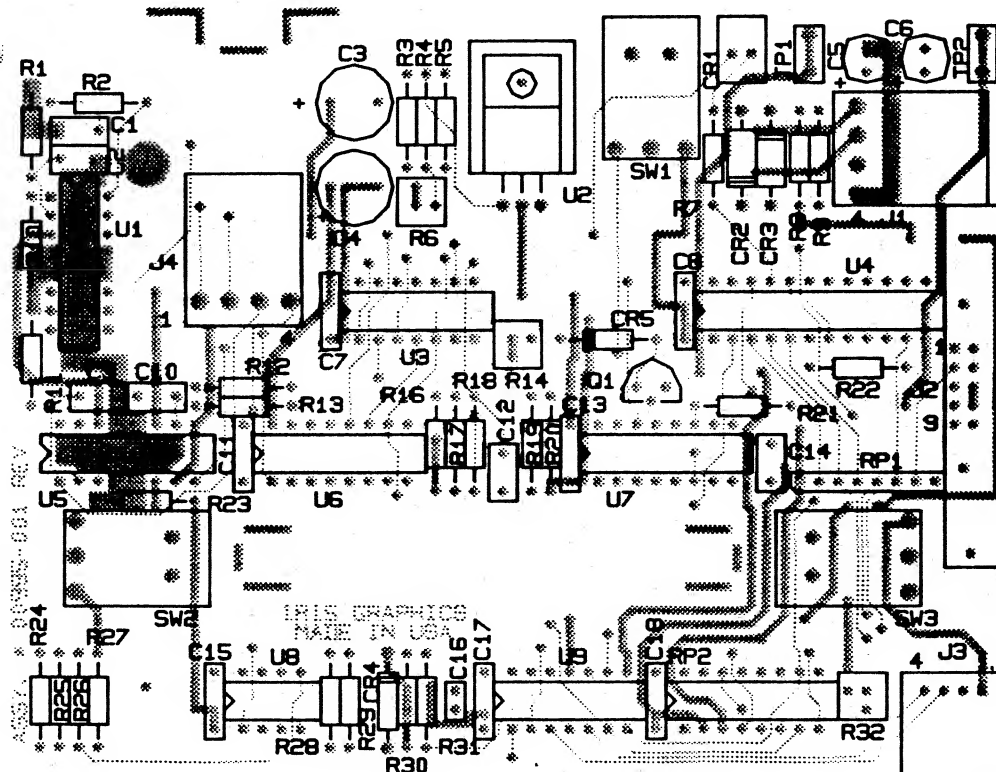
Parallel Interface Board

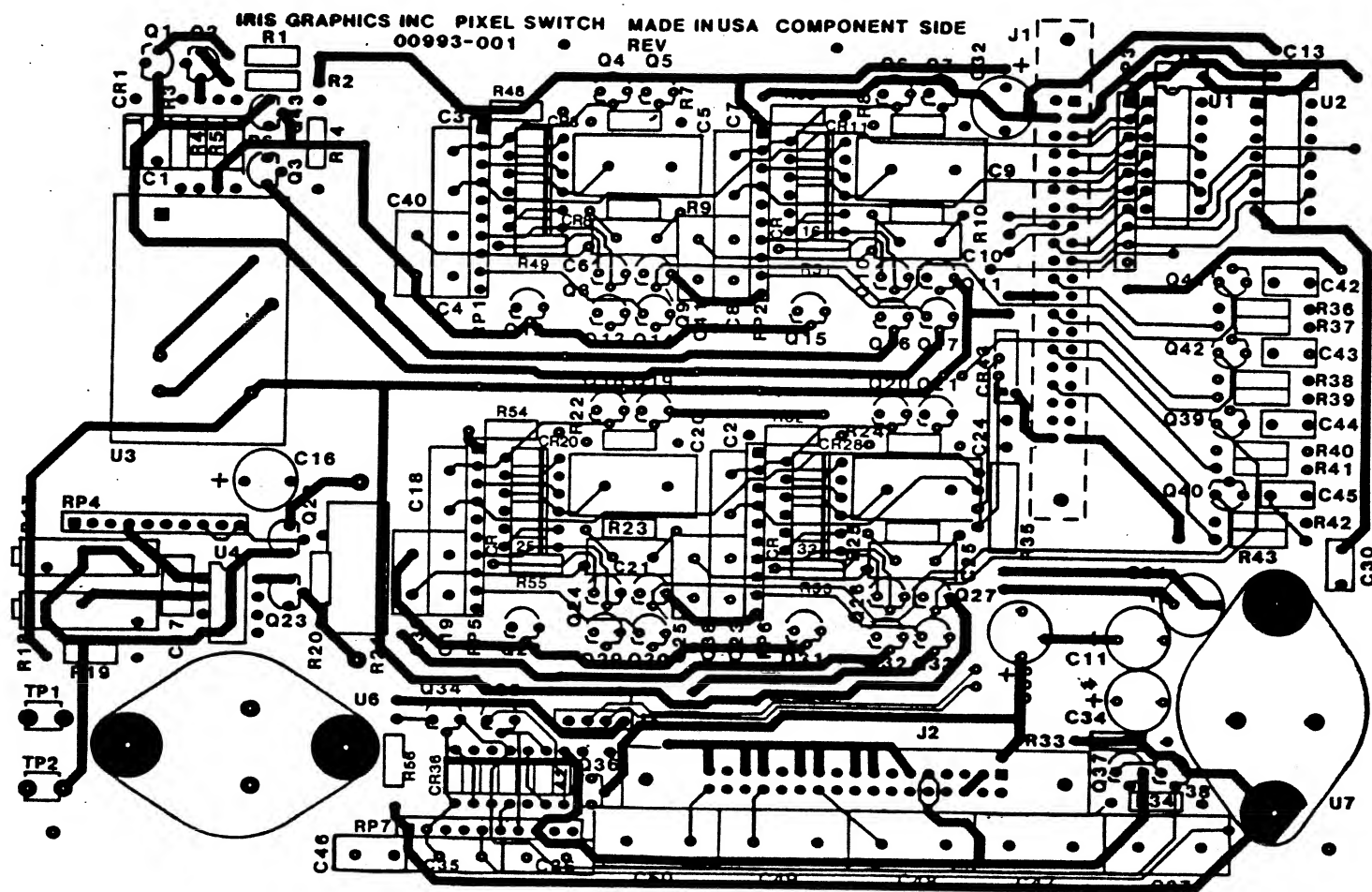


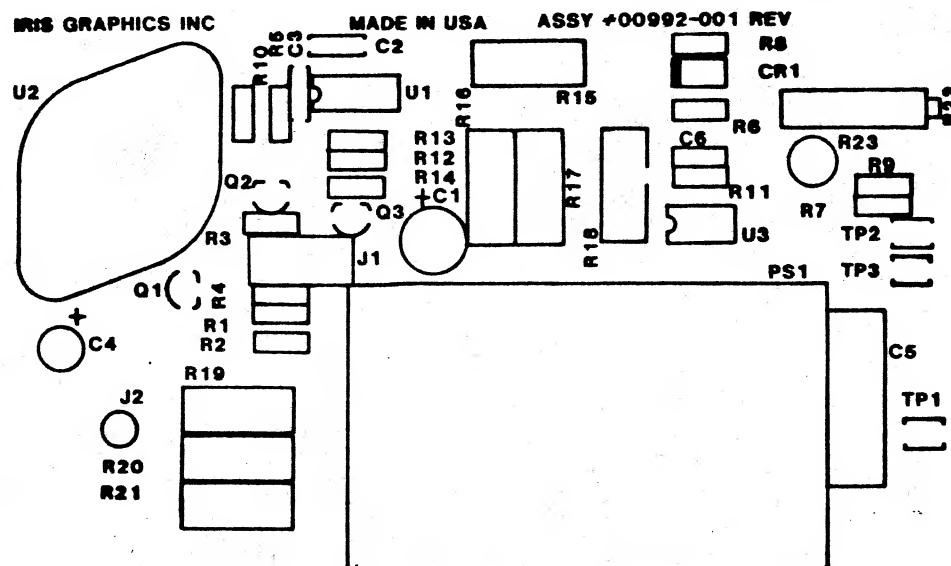
Jet Offset RAM Board



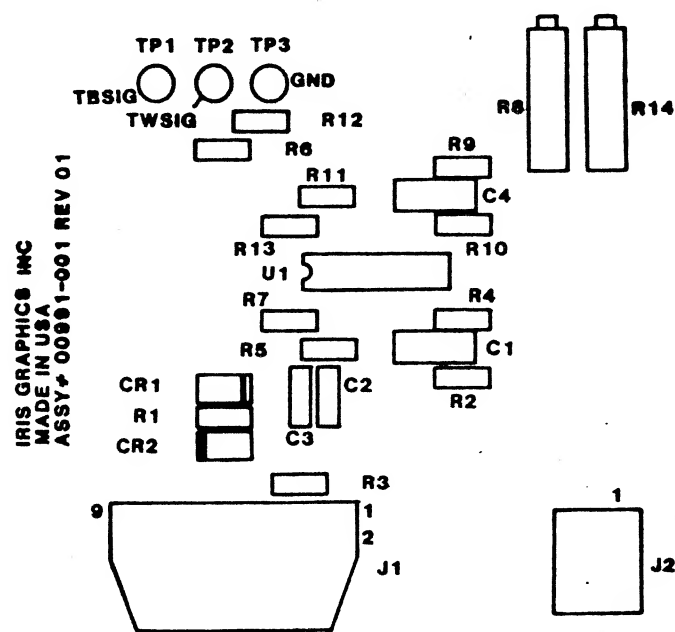
Solenoid Driver Board

**Ink Pump PC Board**

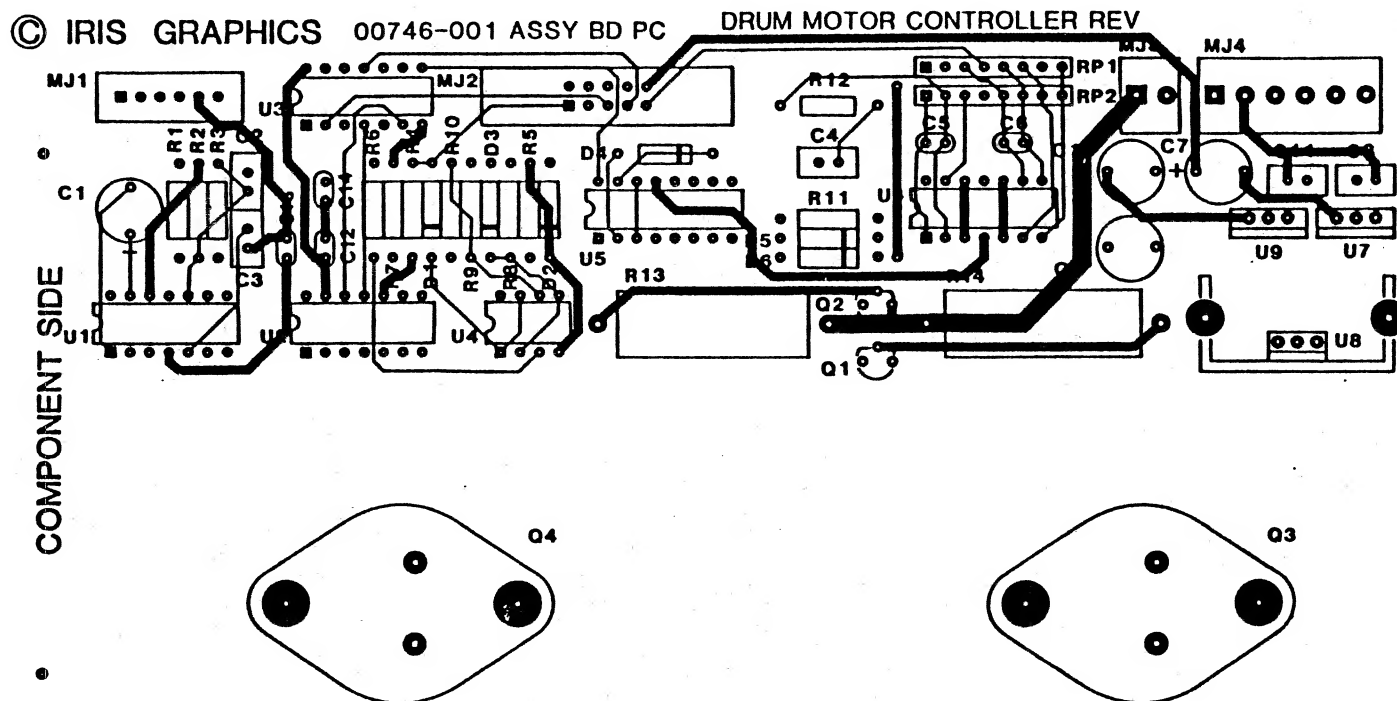
**Pixel Switch Board**

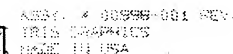


High-Voltage Board

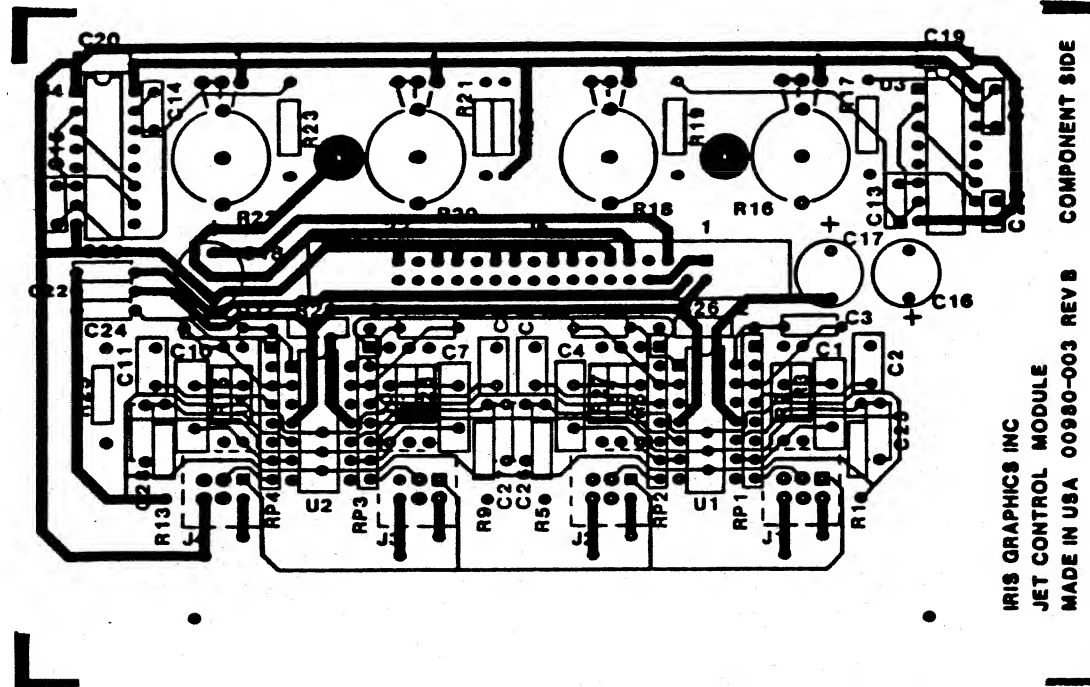


Target Block Amp

**Drum Motor Board**



IRIS



Jet Control Module

M

Spare Parts List

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Cables	M-2
IEEE 488 Cable System to P.C.	M-2
Versatec 37 Conductor Cable P.C. to Printer	M-2
Consumables	M-2

Spare Parts

Part No.	Description
00098-001	Line Ink, Long
00098-003	Line Ink, Short
00117-001	Switch Momen PNL MT PB DPST
00118-001	Switch Momen PNL MT PB PU/PL
00177-002	Assy. Valve Solenoid 2 way 12V
00203-001	Clip Safety Gas Spring
00206-001	Bottle Wast 2 Qt.
00216-001	Cord Power Black 6.75 ft.
00222-023	Fuse 5 × 20 MM SB 250V (5A)
00222-025	Fuse 5 × 20 MM SB 250V (8A)
00294-002	Assy Fan Tube Axial Ball
00312-001	Assy Floats
00313-001	Switch Power Rocker Dpst Black
00366-001	Assy Filter Air Line Rework
00408-001	Filter Liquid Disposable
00649-001	Assy Pump Vacuum
00746-001	Drum Motor Board
00801-001	Assy Motor Encoder Drum
00874-001	Assy Structure Deflection
00890-001	Assy Manifold
00907-001	Assy Nozzle
00913-001	Assy, Display and Control
00917-001	Assy Hat
00950-001	Band Drive
00959-001	Assy Base Head
00980-001	Assy PC BD Jet Connect
00982-001	Bib Printer
00992-001	Assy PC BD Hi-Voltage
00993-001	Assy PC BD Pixel Switch
00996-001	Assy PC BD Solenoid Driver
00997-001	Assy PC BD Nozzle Offset RAM
00998-001	Assy PC BD Tape Interface
00999-001	Assy PC BD Parallel Interface
01000-001	Assy PC BD MCP
01038-001	Assy Pump Ink IRIS
01095-001	Switch Plot
01113-001	Power Supply PC 200W/PC
01160-001	Gasket Evacuation
01167-001	Assy Brush Static
01170-001	Assy Drive Carriage

contact no.

Part No.	Description
01260-001	Upper Control Board
01292-001	Nozzle Cleaning Fixture
00995-001	Pump PCB
01373-001	Pump Float
00034-006	O-ring

Cables**IEEE 488 Cable System to P.C.**

00670-002	15' Cable
00670-003	30' Cable
00670-004	50' Cable

Versatec 37 Conductor Cable P.C. to Printer

00671-001	15'
00671-002	30'
00671-003	50'
00671-004	100'
00671-100+	(Maximum 500') (special order)

Consumables

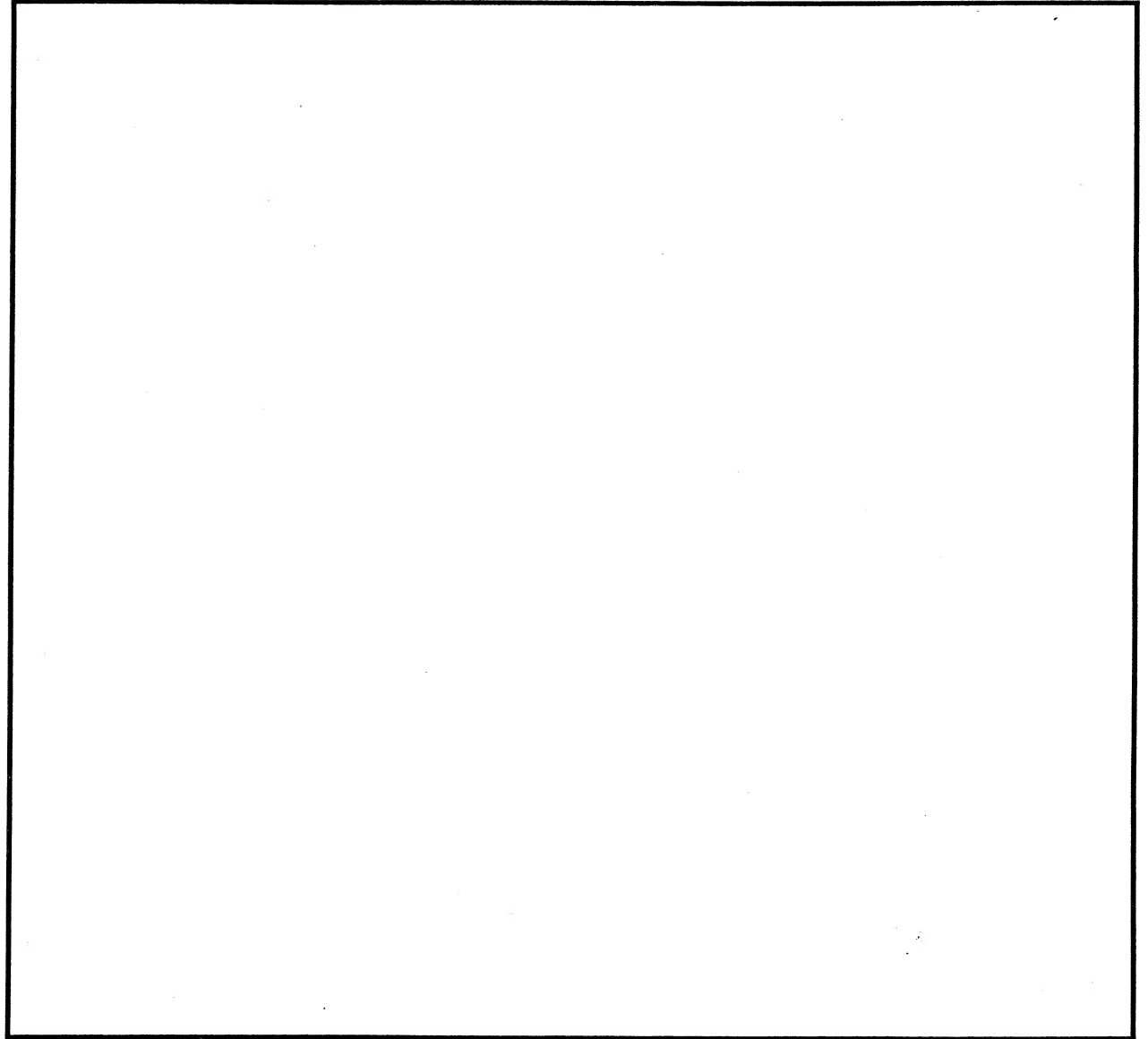
Part No.	Description
01216-002	Paper, Crystal white 24 × 24 (200 sheets/ pkg.)
00091-001	Tape film double coated (3M #Y9415)

Ink (Minimum Order: 20 Bottles)

01164-001	Magenta Ink
01164-002	Yellow Ink
01164-003	Cyan Ink
01164-005	Black Ink

N

Service Log



NOTES

Service Log

Date: _____	INSTALLATION	Parts
Field Engineer _____	Comments: _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____

Date: _____	Problem: _____ _____	Parts
Field Engineer _____	Resolution: _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____

Date: _____	Problem: _____ _____	Parts
Field Engineer _____	Resolution: _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____

Date: _____	Problem: _____ _____	Parts
Field Engineer _____	Resolution: _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____

Date: _____	Problem: _____ _____	Parts
Field Engineer _____	Resolution: _____ _____ _____ _____ _____ _____ _____	_____ _____ _____ _____ _____ _____ _____

Service Log -- continued

Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____
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Service Log -- continued

Page __ of __

Date: Field Engineer 	Problem: _____ Resolution: 	Parts
Date: Field Engineer 	Problem: _____ Resolution: 	Parts
Date: Field Engineer 	Problem: _____ Resolution: 	Parts
Date: Field Engineer 	Problem: _____ Resolution: 	Parts
Date: Field Engineer 	Problem: _____ Resolution: 	Parts
Date: Field Engineer 	Problem: _____ Resolution: 	Parts

Service Log -- continued

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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____ _____
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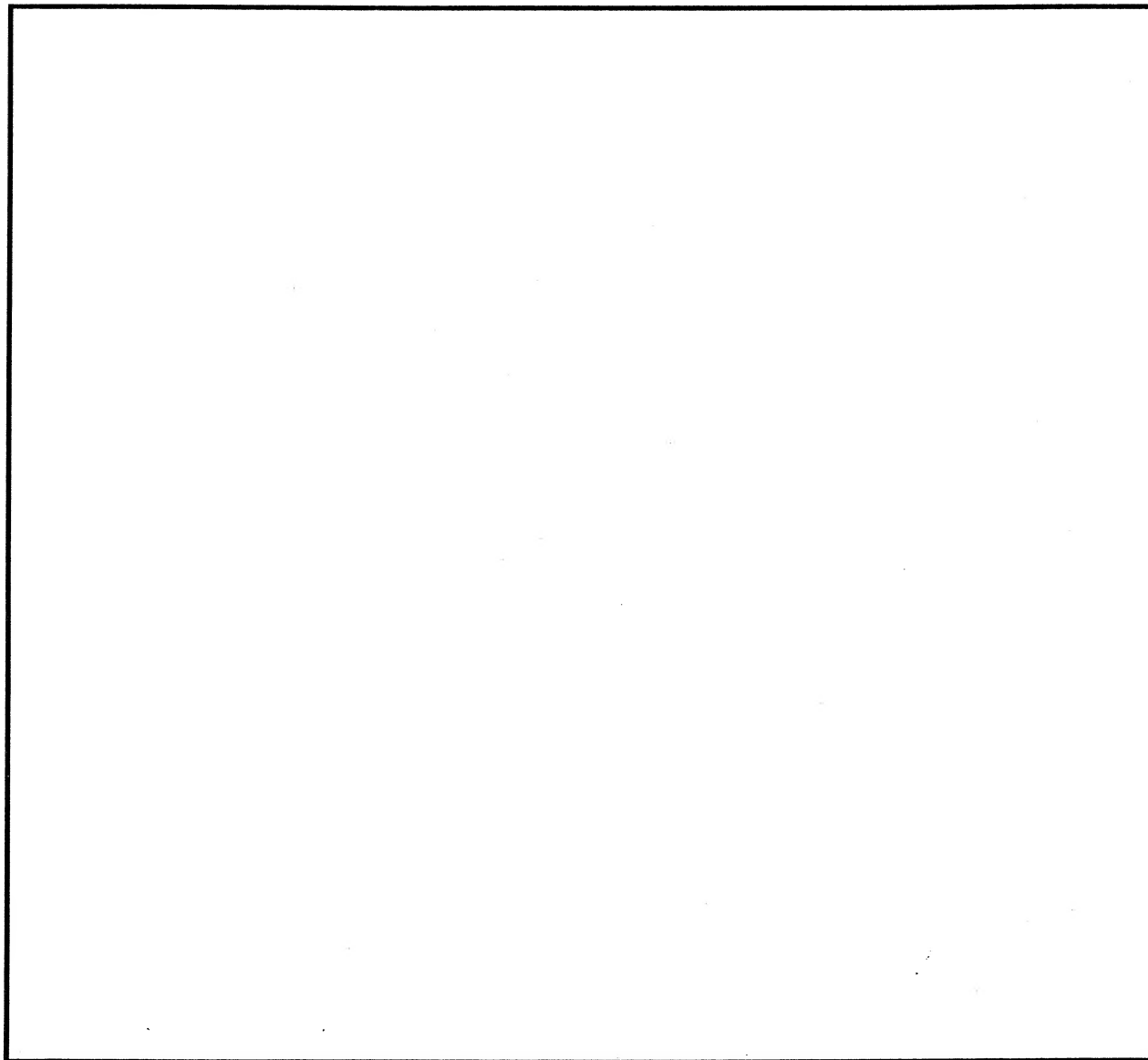
Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____ _____
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Date: _____ Field Engineer _____	Problem: _____ _____ Resolution: _____ _____ _____ _____ _____ _____	Parts _____ _____ _____ _____ _____ _____ _____
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PRE-TEST CHECKLIST

1. Verify Head Electronics voltage settings *while running "knife edge"*
 - a. Charging voltage at TP1 (98.0–102.0v) — R18 on Pixel Switch Board _____
 - b. Stimulation voltage at U7 (24.0–26.0v) — R17 on Pixel Switch Board _____
 - c. Deflection voltage (2150–2250v) — R22 on High Voltage Board *- while running "knife edge"* _____
2. Verify Ink Pump calibration settings (each pump)
 - a. +5v/Gain setting at U2 (4.95–5.05v) — R6 — Measure *base* base of U2 to TP2 (ground) _____
 - b. Transducer Null at TP1 (–0.05–+0.05v) — R32 — Measure TP1 - TP2 (ground) _____
 - c. Max step rate at U4/pin 13 (900–950Khz) (disconnect motor and start pump) — R14 *while "knife edge"* _____
3. Verify Vacuum Transducer calibration (Solenoid Drive Board)
 - a. Null adjustment at TP2 ($\pm 0.10v$) — R5 — TP2 - TP3 _____
 - b. Gain adjust at 10psi/5.0inHg (4.90–5.10v) R4 — base of U8 - TP3 _____
 - c. Output running print/test (1.50–2.00v) _____
4. Master Clock and XTAL Frequency Synthesizer Operation
 - a. Verify Master Clock Operation @U50 Pin 1. Use C1 to adjust to 6.144 MHz _____
 - b. Verify XTAL frequency synthesizer operation. (Select frequencies 01–16 using control panel and check values at U49 pin 4.) — MCP Board. _____
5. Verify "center voltage" of phase shift circuits (at FREQ=08, voltages at pin 9 of U82, U92, U93, and U94 should be in range of 2.40–2.80 v.) _____
6. Verify Knife Edge adjustability (each color)
 - a. With Target Block wire disconnected, check voltage across TP1 - TP3 of Target Amp. Use R8 to adjust to 2.5 V. _____
 - b. Turn down jet [48 < all values < 52] _____
 - c. Turn up jet so all ink comes over knife [all values > 52 and increasing L-to-R] _____
 - d. Adjust for near-zero (center value <05) _____
7. Verify Mechanical Adjustments
 - a. Deflection Assembly fit (subjective) _____
 - b. "Hat" fit (subjective) _____
 - c. Band tension (subjective) _____
 - d. Head-to-drum spacing (distance from drum to edge of carriage base = 0.085–0.115 inch for full 24" travel) _____
 - e. Left margin switch (trips 1/32–1/16" from stop) _____
 - f. Right margin switch (trips ~1/4" from stop) _____

8. Verify Upper Control Board settings

- a. Pump pressure at TPx (VPUMP) (7.65–7.70v) — R5 to adjust _____
- b. Drum speed at 150 ips (FPENCA) (8.95–9.05Khz) Check during Grid Pattern
— R4 to adjust _____
- c. BEGIN pulse width at 150ips (60–80 usec) — top left pot inside encoder _____

NOTE: The following checks will be performed running various test patterns, using FACTORY DEFAULT PARAMETERS, except that the PRINT AUTOPHASE option should be set to YES. Verify that DRUM SPEED=150ips and that FREQ=08.

9. Verify Auto-phase performance, by running individual FREQ COLOR RUNs for reach color

- a. Check knife-edge adjustment (subjective) _____
- b. Good quality at 5–10 (subjective) _____
- c. Auto-phase visible at all freq _____
- d. “Ring-around-the-drum” no more than twice _____
- e. Lowest bar as dark as any bar above at all frequencies _____
- f. No “choppiness” in lowest bar except when contrast in middle bars is extremely poor _____

10. Verify drum motor speed uniformity . . . start ALL COLOR GRID and observe motor drive output at the top of R14 on drum motor PCB.

- a. Drive voltage (avg) in range of 4.8–5.2v _____
- b. Peak-peak variation less than 0.5v _____

11. Verify ink amp noise sensitivity. [use new TEST AUTOPHASE routine — limits TBD]**12. Verify “smoothness” of stepper drive (subjective).****13. Verify error condition sensing**

- a. WASTE BOTTLE FULL _____
- b. WASTE BOTTLE MISSING _____
- c. KNIFE EDGE NEEDED _____
- d. HV SPIKE _____
- e. VOLTAGE OVERLOAD _____
- f. INK PUMP ERROR (all pumps) _____
- g. INK PUMP NOT HOME (all) _____
- h. DRUM SPEED ERROR _____
- i. STEPPER TIMEOUT _____
- j. RIGHT MARGIN SWITCH _____
- k. VACUUM ERROR _____
- l. ????

Phn 32 volts,

PRINT QUALITY VERIFICATION (at best freq in range of 5–10)

NOTE: Unless otherwise specified, all print quality tests run with drum speed = 150ips, all color density/contrast values at default, and resolutions set for 240/240dpi (English) or 10.0/10.0dpmm (metric). KEEP ALL SAMPLES GENERATED IN AN INDIVIDUAL SYSTEM TEST FILE.

1. COLOR FREQ RUN/ALL COLOR

- a. Verify that top of pattern is 0.20–0.30" from lower reference mark on drum. _____
- b. Verify that quality for each color is similar to the individual FREQ COLOR RUNs _____
- c. Check for absence of gearbox striations (regular density variations 15 or 30 per in) _____
- d. Check for absence of irregular striations caused by vibration. _____

2. GRID PATTERN/ALL COLOR (with autophase printing) [let run for .75 inches, then move right and let the pattern continue] for at least 15"

- a. Check autophase in first .75" for good contrast and knife-edge adjustment. _____
- b. Check individual line quality (subjective) _____
- c. Check convergence of vertical lines (all adjustments must be in 11:00 to 1:00 range) _____
- d. Check convergence of horizontal lines (all pots must be in 10:30 to 1:30 range) _____
- e. Check for absence of misplaced dots which might be caused by erratic BEGIN pulses, glitches in the PIXEL PLL circuit, etc. _____
- f. Check horizontal image size . . .
16 cycles = 12.00" $\pm$ 1/64" (240 dpi) or
16 cycles = 11 63/64" $\pm$ 1/64" (10 dpmm) _____
- g. Check vertical image size . . .
45 cycles = 12.00" $\pm$ 1/64" (240 dpi) or
48 cycles = 12 3/32" $\pm$ 1/64" (10 dpmm) _____

3. GRID PATTERN/INDIVIDUAL/ALL COLORS (LOW DENSITY) [set all color density values = 10 and run at least 3" of each color 4, 3, 2, 1, then 8" of all color].

- a. Check line straightness ($\pm$ half dot diam) _____
- b. Check dot uniformity (should be very few, if any, "split" dots in any color) _____
- c. Check for vertical convergence variations over 8" (pulley out spec if cyan and/or magenta shifts one dot diameter min/max with respect to the black line.) _____

4. COLOR BARS/ALL COLOR [black color density = 00, all others = default . . . until raster count > 2500]

- a. Check for gearbox striations (15/30 per in) _____
- b. Check for irregular/vibration striations _____
- c. Check for "rainbow" effect due to pulley (hue shift that repeats at 4" intervals) _____

5. COLOR BARS/ALL COLOR [all densities = default . . . run until raster count > 2500]

- a. Check for gearbox striations (15/30 per in) _____
- b. Check for irregular/vibration striations _____

- c. Check for "rainbow" effect due to pulley (hue shift that repeats at 4" intervals) _____

NOTE: Compared to the "3-color" pattern above, this pattern will have much more noticable striations and/or hue shifts, especially in the mid-tones. In actual usage, the printer should rarely, if ever, encounter such conditions. Whether or not the striations and hue shifts are excessive is a judgement call until more definitive measurement techniques can be developed. In general, if the results of the 3-color tests are good, the printer should not be rejected unless the results of this test are unusually poor.

6. PRINT SAMPLES/SCITEX "CLOWN" TAPE [PRINT AUTOPHASE set at NO]

- a. SPEED TESTS (240dpi or 10dpmm and REPEAT)

— 100ips _____
— 150ips _____
— 200ips _____
— 250ips (striations may be noticable) _____

- b. RESOLUTION TESTS (150ips and REPEAT)

— 200/200dpi or 8.0/8.0dpmm _____
— 240/240dpi or 10.0/10.0dpmm _____
— 300/300dpi or 12.0/12.0dpmm _____

- c. REPLICATION TEST (300dpi or 12 dpmm)

— 3x vert and horiz replicate (with expanded RAM option) _____

- d. MIRROR IMAGE TEST (300dpi or 12dpmm)

— MIRROR, 1x replicate, and REPEAT _____

- e. MAX DENSITY TEST (300dpi or 12 dpmm) (with expanded RAM)

— All color densities = 100, no multistrike, and REPEAT _____

- f. MULTI-STRIKE TEST (300dpi or 12dpmm) (with expanded RAM)

— 3x MULTI-STRIKE, no mirror, not REPEAT [max raster length = 10" (jet ram limit)] _____

NOTE: ALL PRINT SAMPLES SHOULD BE CHECKED FOR OBVIOUS PRINT DEFECTS AND SAVED IN THE SYSTEM TEST FILE

ON-LINE SYSTEMS TESTING (IF APPLICABLE)

1. PARALLEL INTERFACE VERIFICATION

- a. Transmit test images _____
b. Exercise image placement features _____
c. Exercise parameter download feature _____
d. Exercise color table download feature _____
e. Test printer timeout error _____

2. HOST INTERFACE VERIFICATION (IF APPLICABLE)

- a. Transmit images from "host simulator" _____

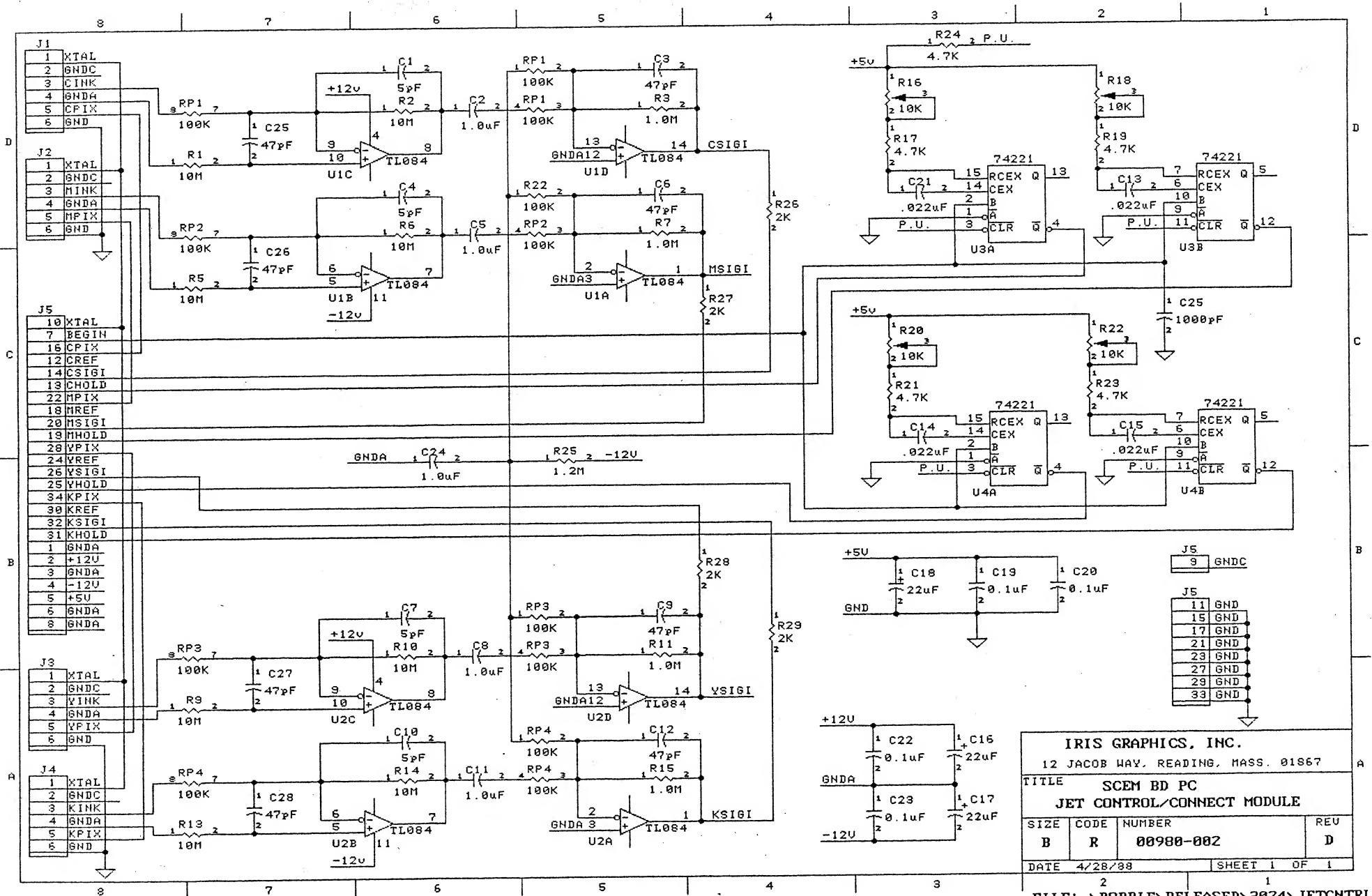
NOTES

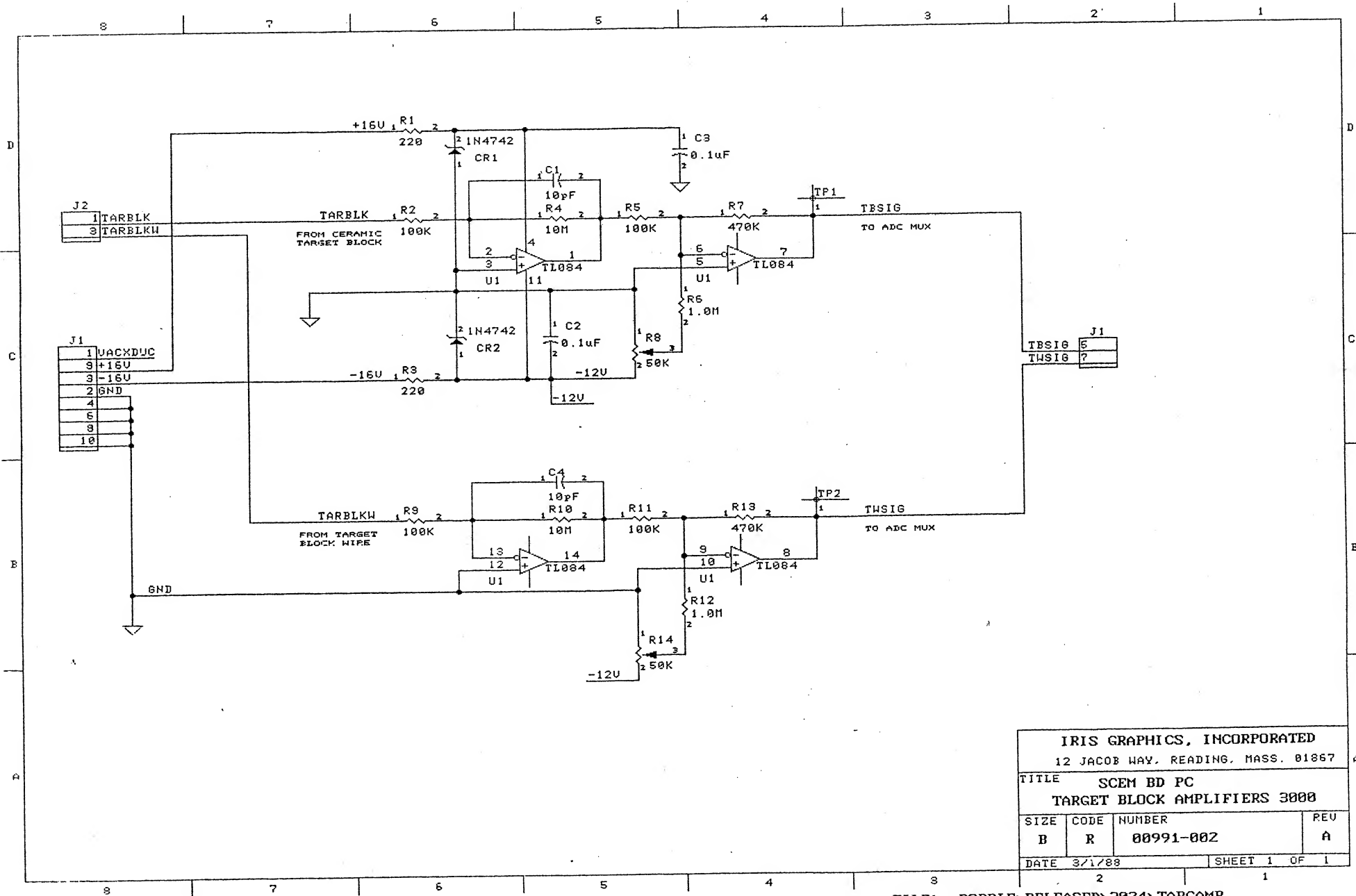
Q

Schematic Diagrams

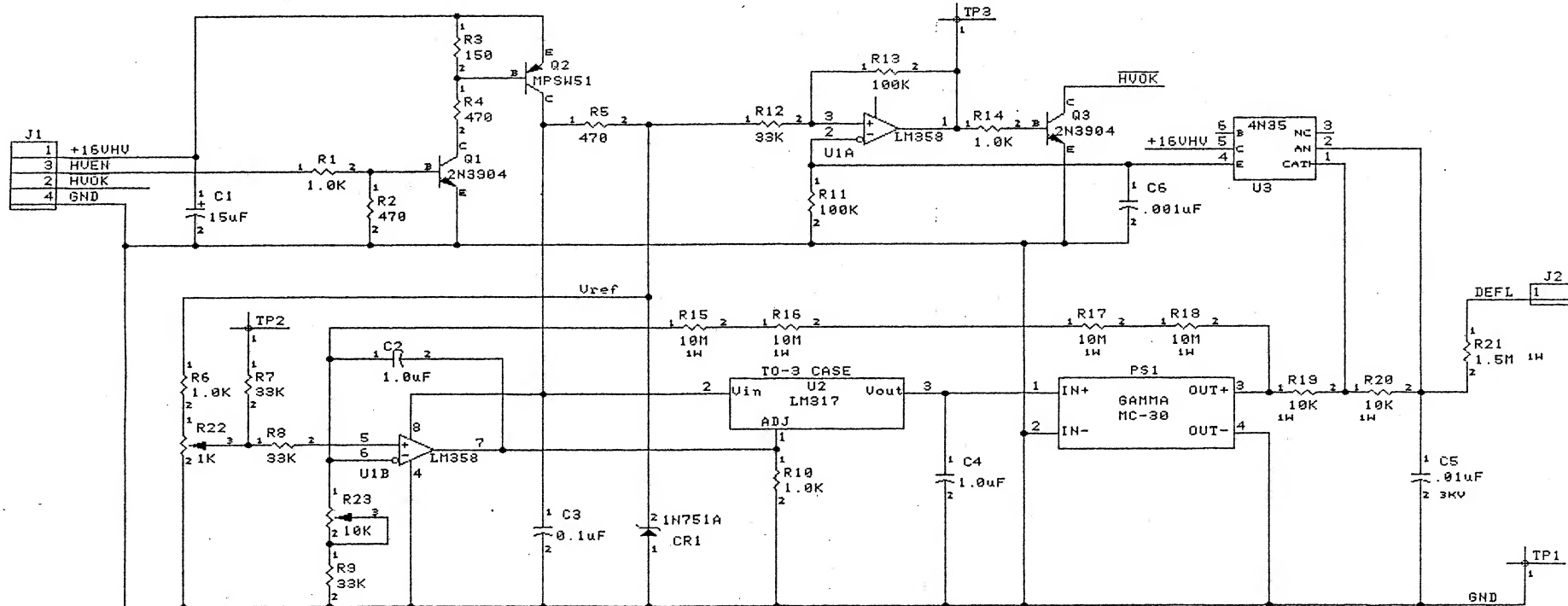
Section Table of Contents

Drum Motor Controller — 2024/3000	Q-2
Upper Control Logic (5 sheets)	Q-3—Q-7
Jet Control Connect Module	Q-8
High Voltage Supply 3000	Q-9
Pixel Switch 3000 (3)	Q-10—Q-12
Ink Pump — Constant Flow (2)	Q-13—Q-14
Solenoid Driver (2)	Q-15—Q-16
Nozzle Offset RAM (5)	Q-17—Q-21
3000 Tape Interface (5)	Q-22—Q-27
Parallel Interface 3000	Q-28—Q-34
Machine Control Processor [MCP] (11)	Q-35—Q-46
TB1 Terminal Block Wiring	Q-47
Interconnections — 3024	Q-48
Upper Control — 3000 (5)	Q-49—Q-54





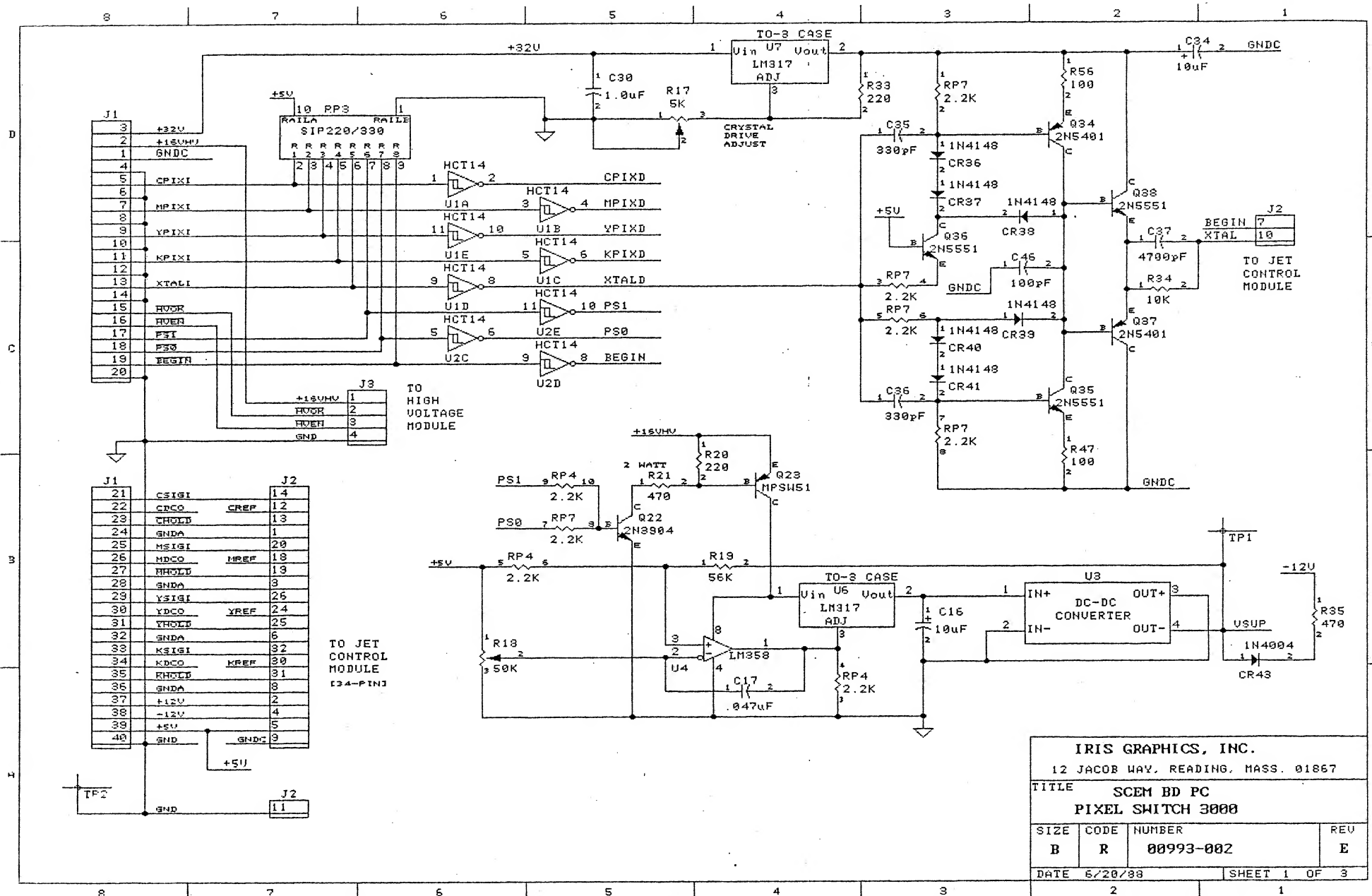
IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC			
TARGET BLOCK AMPLIFIERS 3000			
SIZE	CODE	NUMBER	REV
B	R	00991-002	A
DATE 3/1/88		SHEET 1 OF 1	



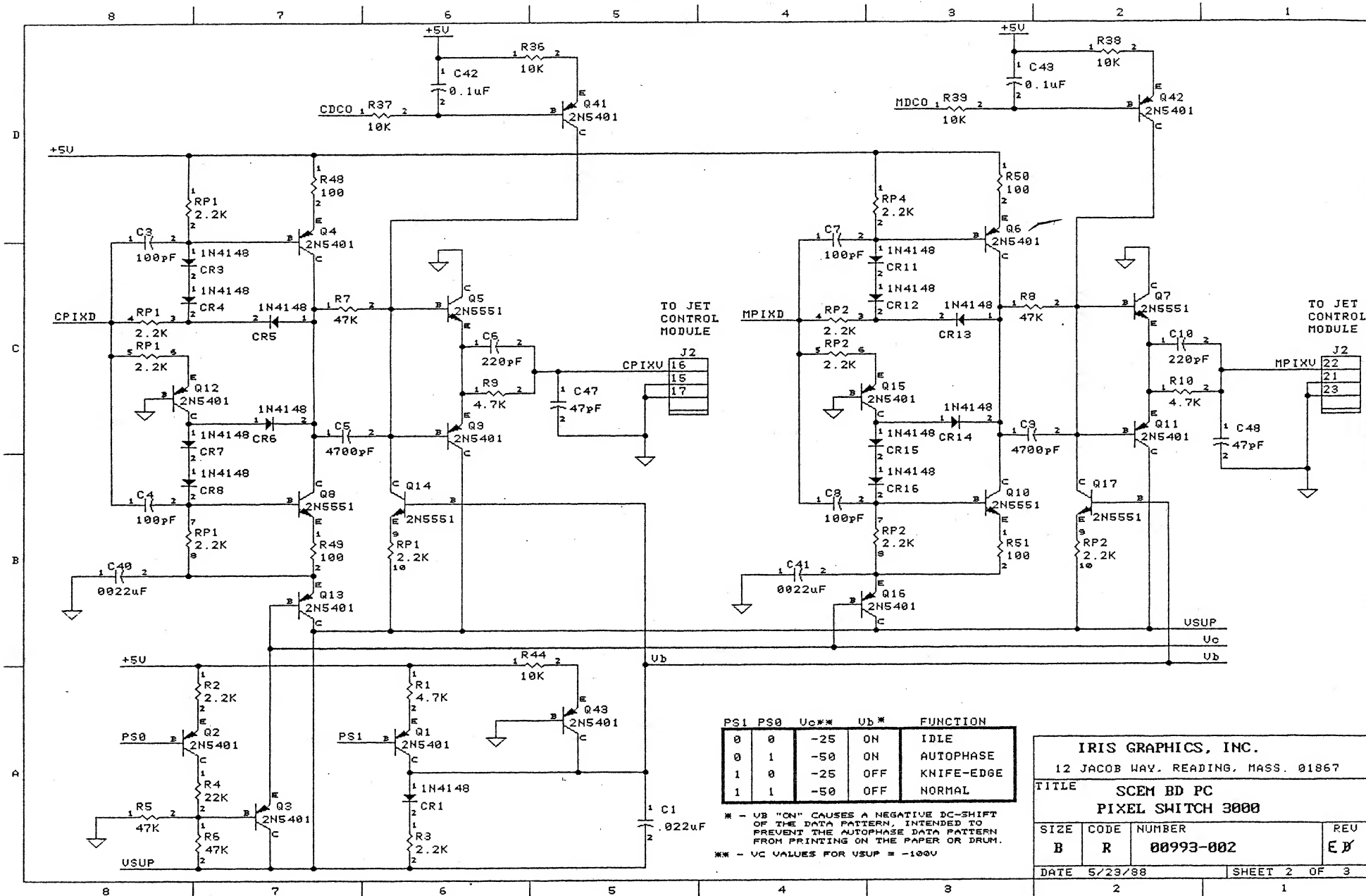
NOTE - TO CALIBRATE, SET R22 SO THAT THE VOLTAGE AT TP2 IS 2.00V. THEN ADJUST R23 SO THAT THE OUTPUT VOLTAGE (DEFL) IS 2000 VOLTS.

IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCHEM BD PC			
HIGH VOLTAGE SUPPLY 3000			
SIZE	CODE	NUMBER	REV
B	R	00992-002	A
DATE 2/19/88		SHEET 1 OF 1	

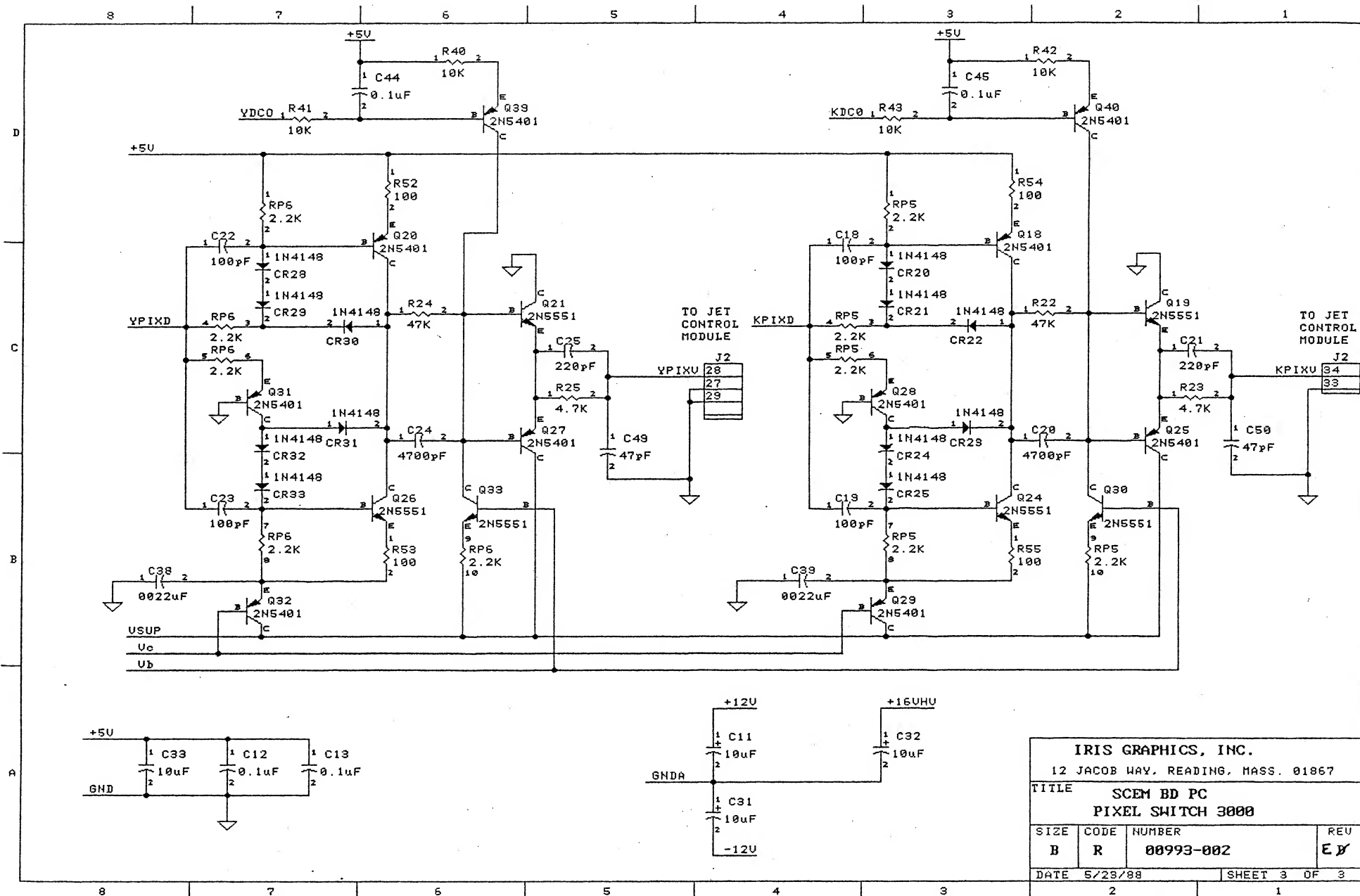
FILE: \ROBBIE\RELEASED\3024\HV3000

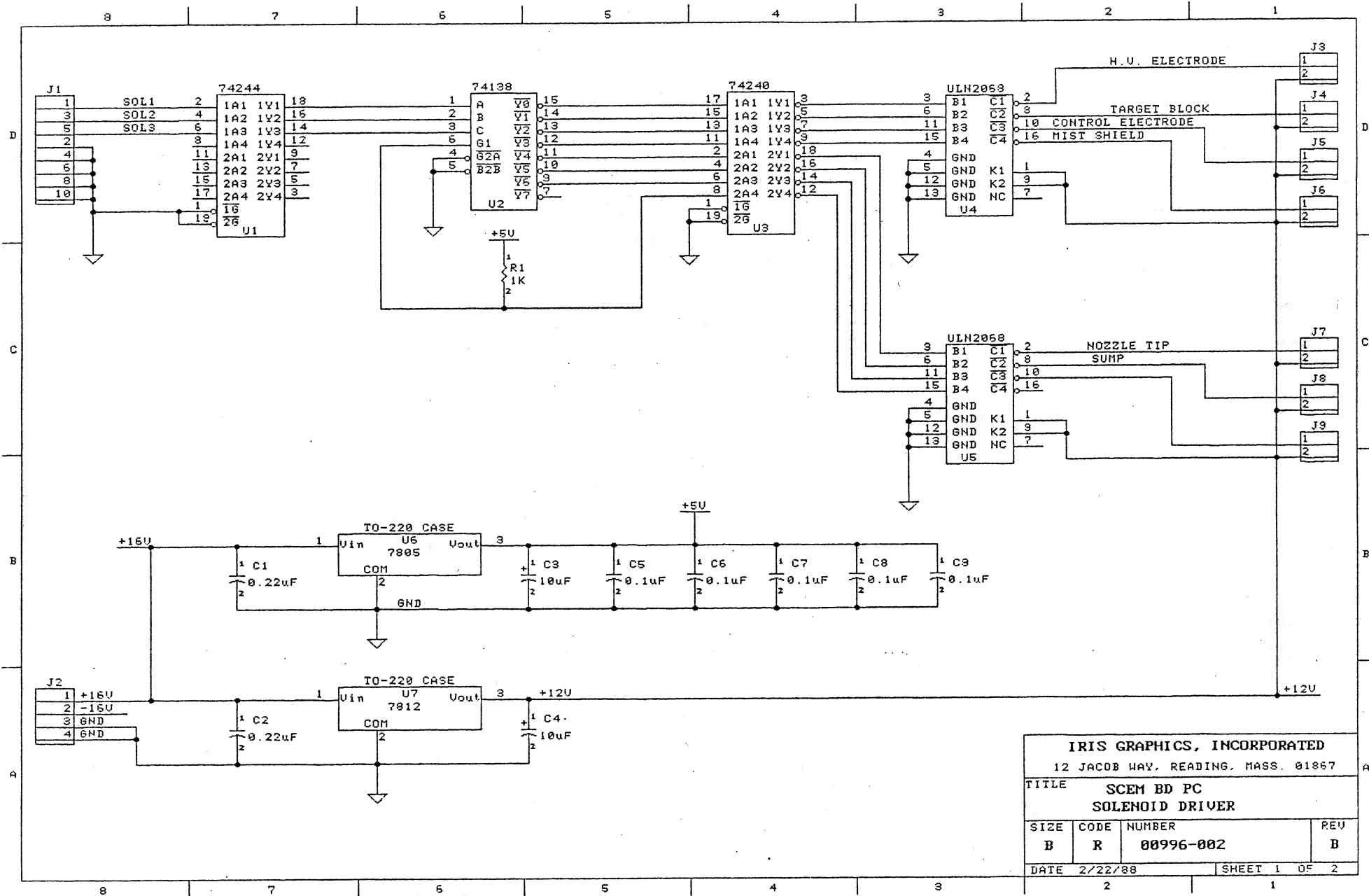


FILE: \ROBBIE\RELEASED\3024\PIX30001



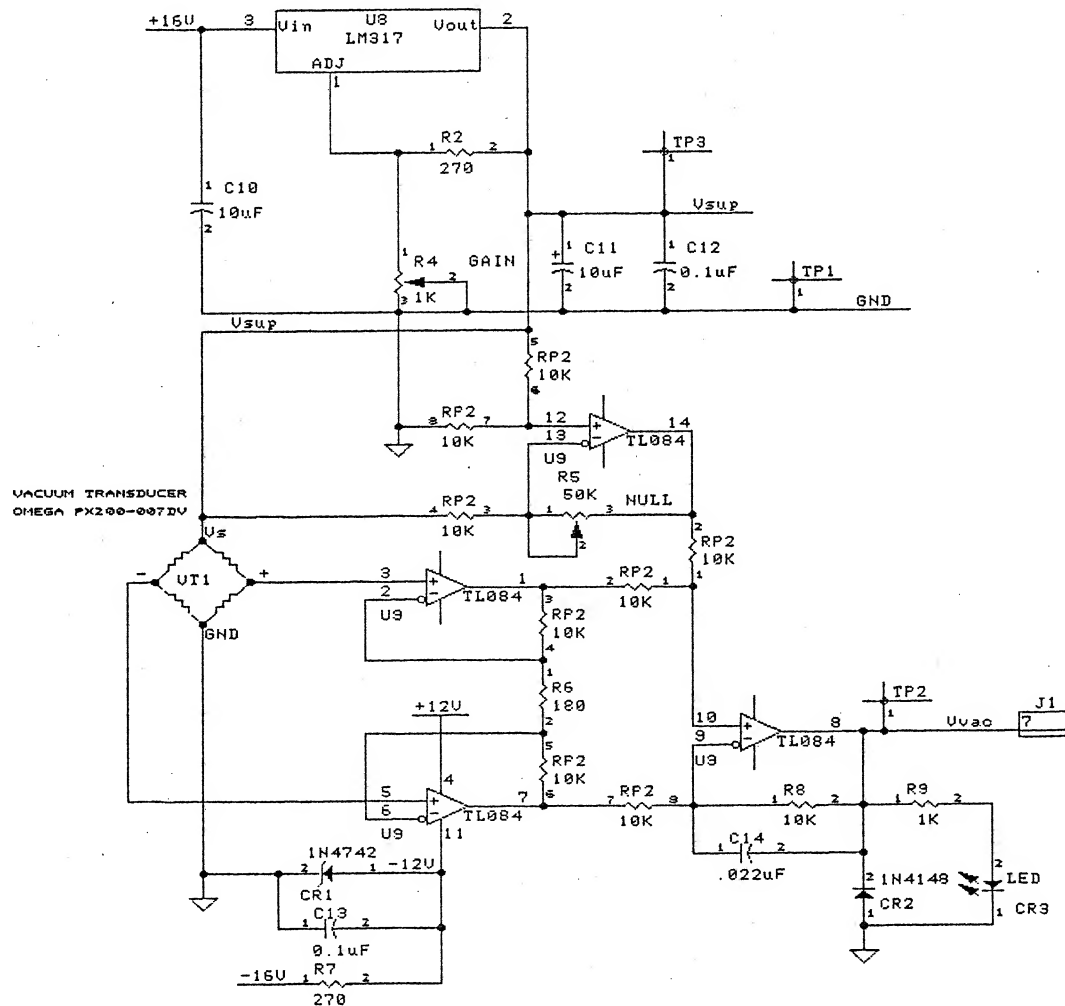
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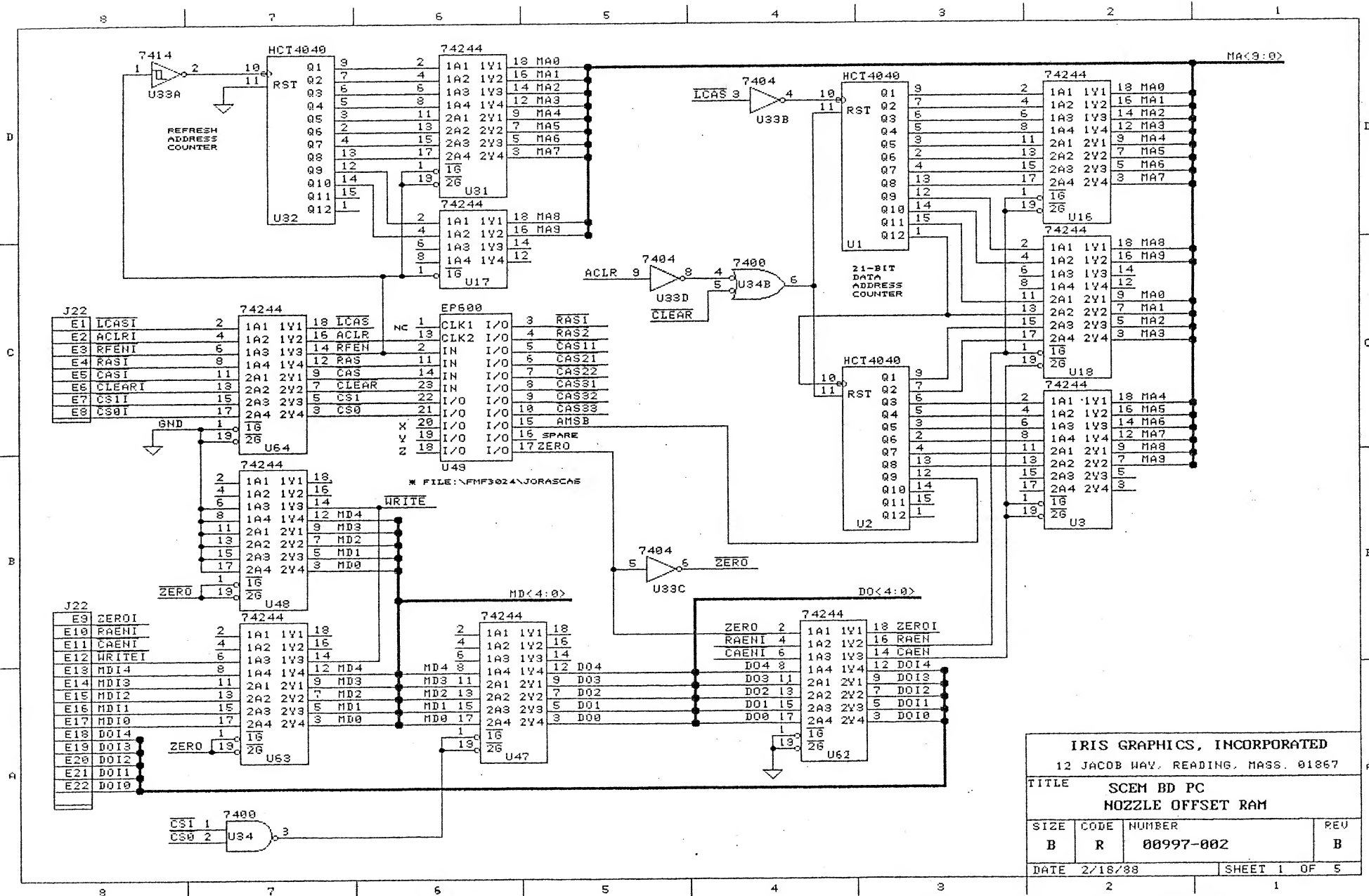
IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC			
SOLENOID DRIVER			
SIZE	CODE	NUMBER	REV
B	R	00996-002	B
DATE 2/22/88		SHEET 1 OF 2	

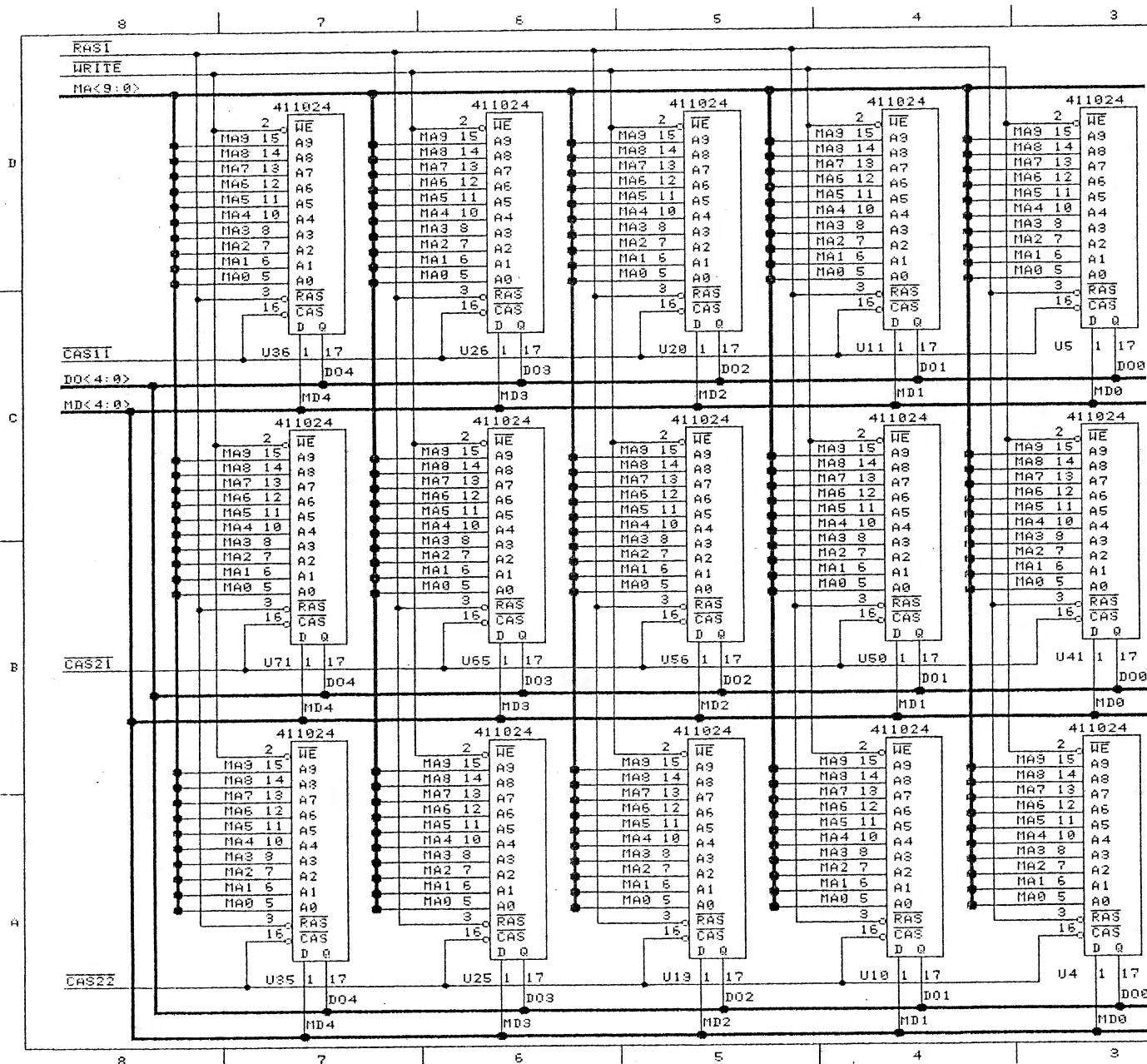
FILE: \ROBBIE\RELEASED\3024\SOLDRV1



IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCSEM BD PC SOLENOID DRIVER			
SIZE B	CODE R	NUMBER 00996-002	REV B
DATE 2/22/88		SHEET 2 OF 2	

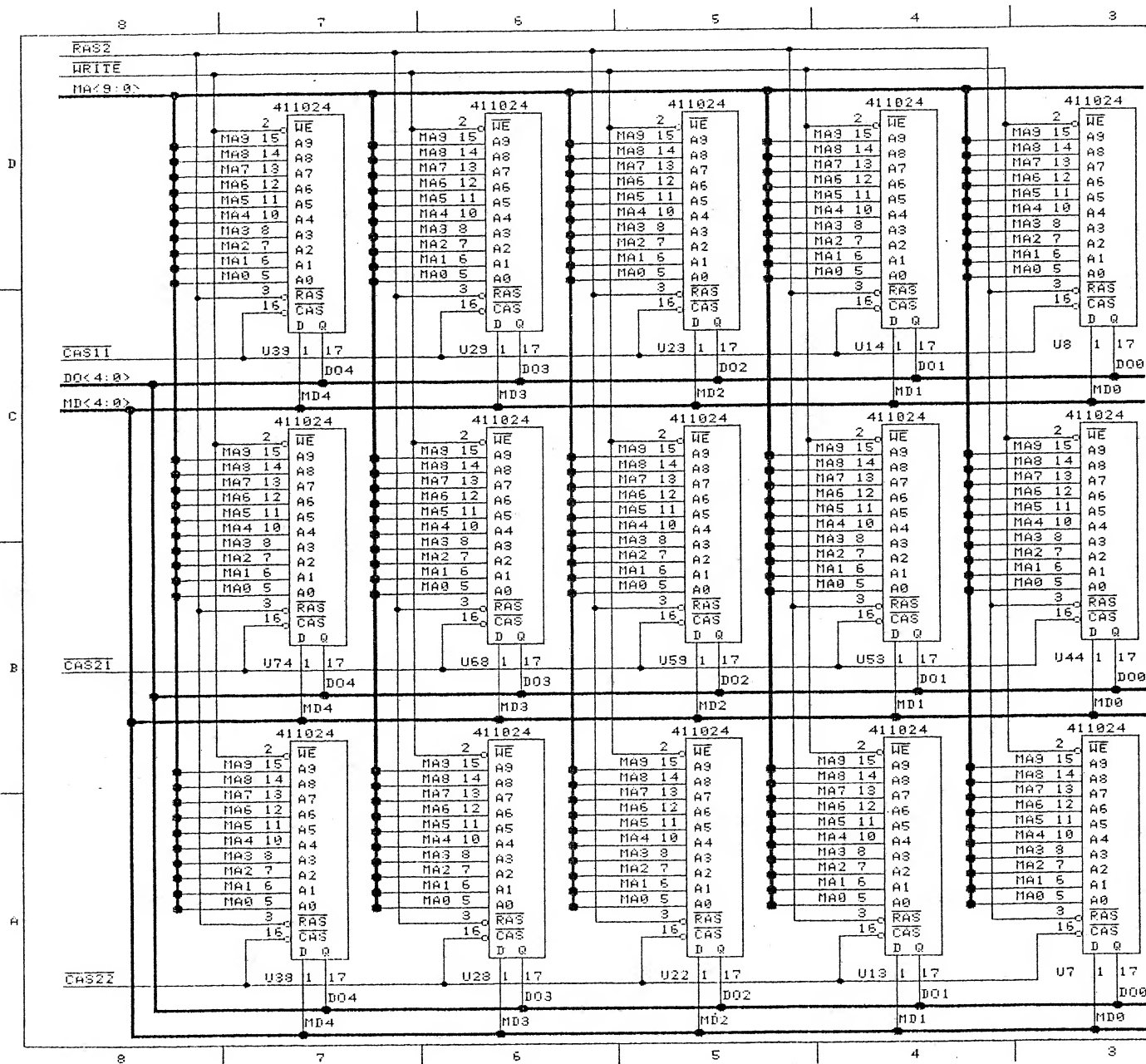
FILE: \ROBBIE\RELEASED\3024\SOLDREV2





IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC NOZZLE OFFSET RAM			
SIZE	CODE	NUMBER	REV
B	R	00997-002	B
DATE 2/18/88		SHEET 2 OF 5	

FILE: \ROBBIE\RELEASED\3024\JORAM2



IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCHEM BD PC NOZZLE OFFSET RAM			
SIZE	CODE	NUMBER	REV
B	R	00997-002	B
DATE 2/18/88		SHEET 4 OF 5	

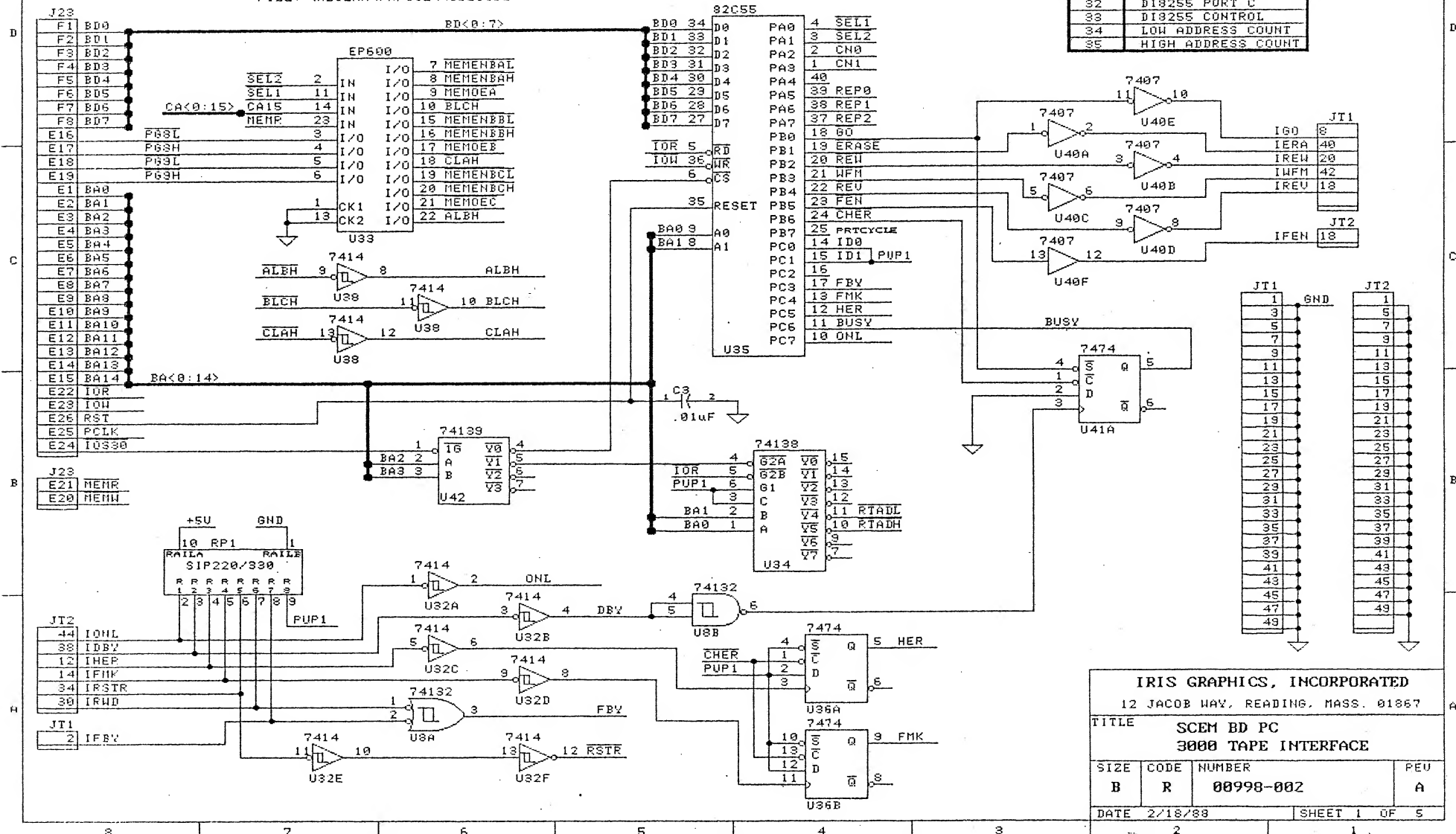
FILE: \ROBBIE\RELEASED\3024\JORAM4

NOTE - PC VERSION ADDS DECODING ON BOARD TO "CHIP SELECT" THE S255 AND READ THE TAPE ADDRESS COUNT.
REV 03 USES EPROM TO ALLOW REPLICATION FOR DATA TYPES OTHER THAN "4-COLOR".

FILE: \ALTERA\FMF3024\IODECODE

IOS I/O PORT

30	DI8255 PORT A
31	DI8255 PORT B
32	DI8255 PORT C
33	DI8255 CONTROL
34	LOW ADDRESS COUNT
35	HIGH ADDRESS COUNT

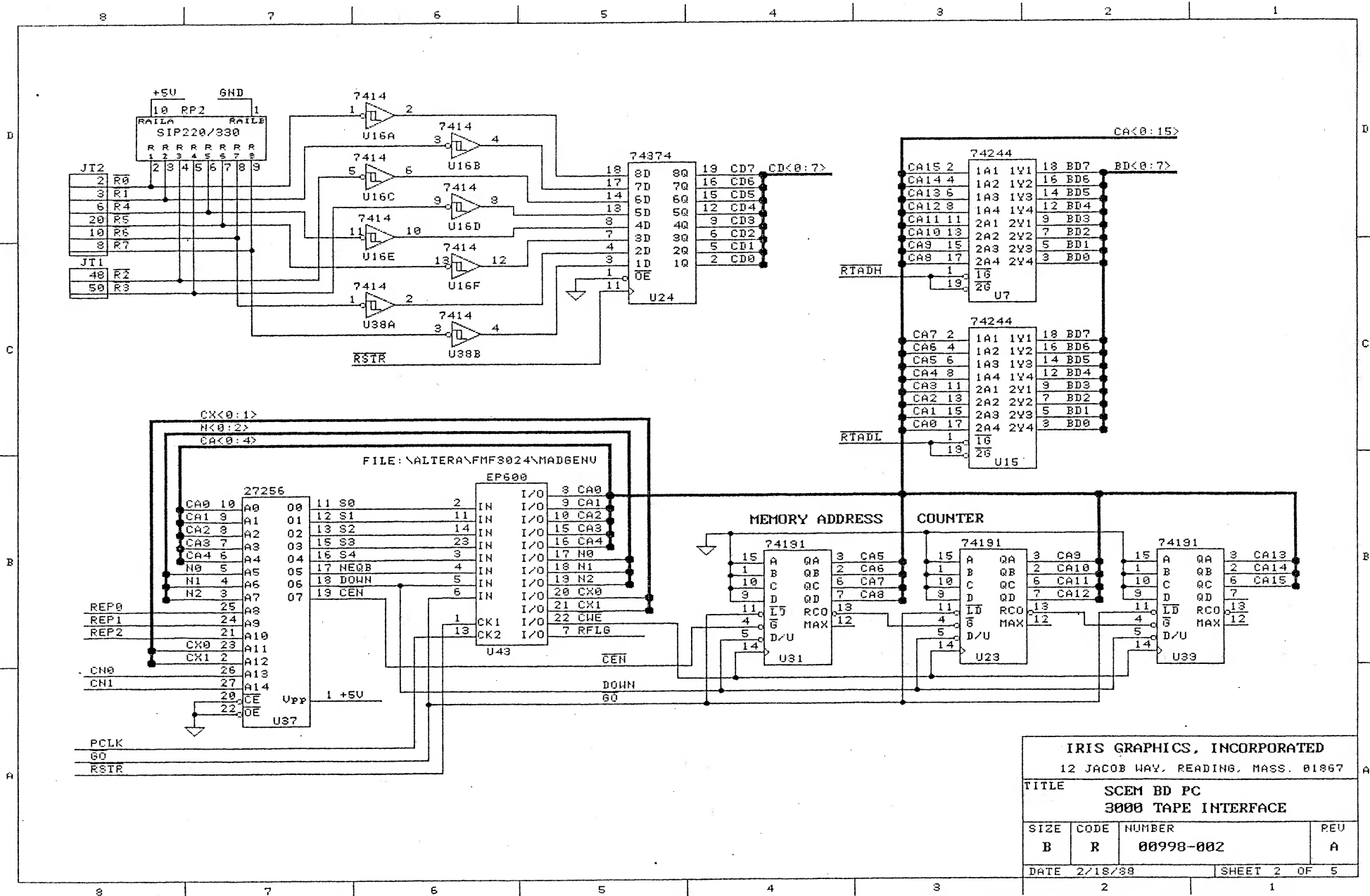


IRIS GRAPHICS, INCORPORATED

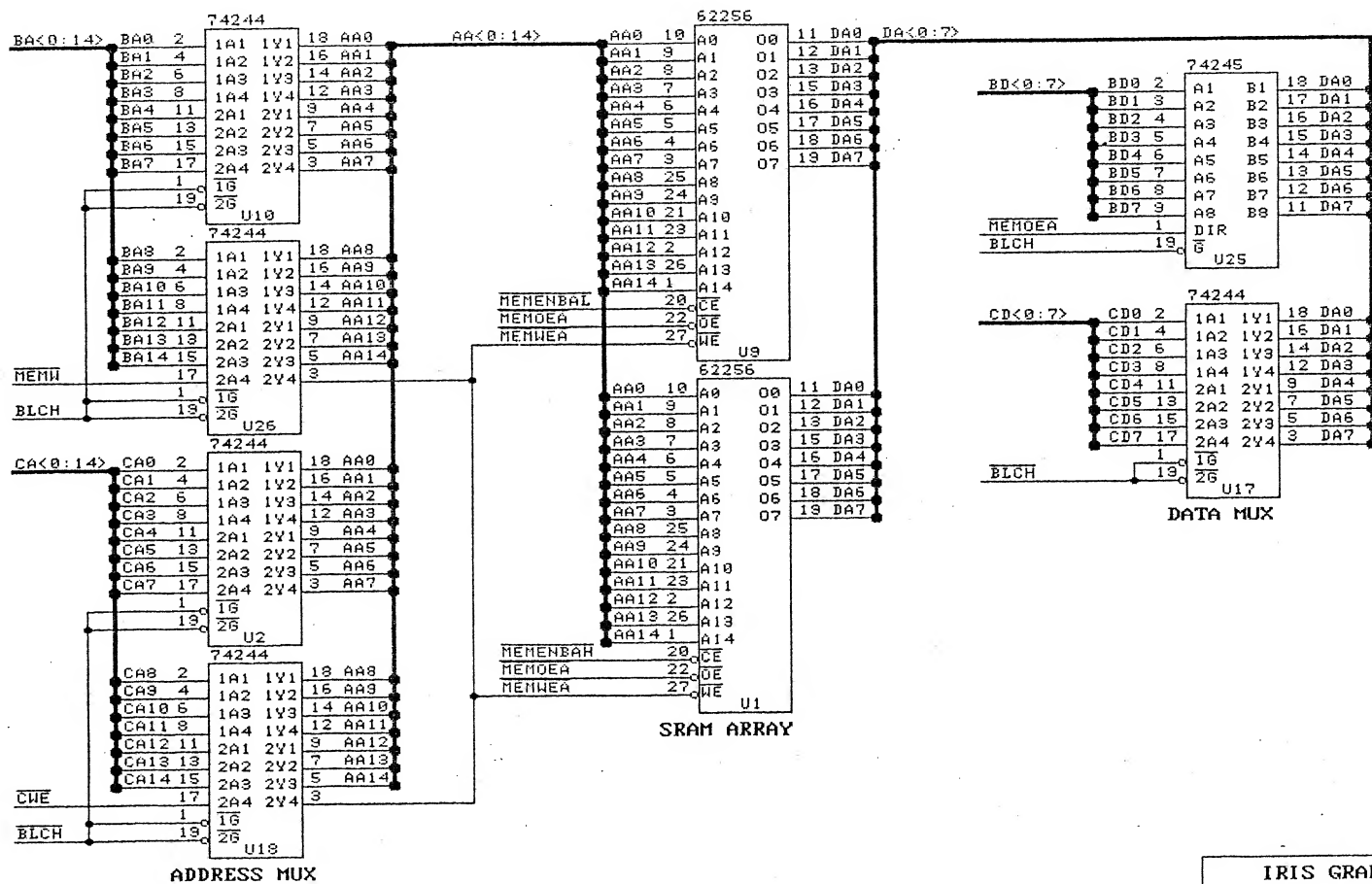
12 JACOB WAY, READING, MASS. 01867

TITLE				SCBM BD PC
				3000 TAPE INTERFACE
SIZE	CODE	NUMBER	PEU	
B	R	00998-002	A	
DATE		2/18/88	SHEET 1 OF 5	

FILE: \ROBBIE\RELEASED\INTR3000\TINTRFC1



IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC			
3000 TAPE INTERFACE			
SIZE	CODE	NUMBER	REV
B	R	00998-002	A
DATE 2/18/88		SHEET 2 OF 5	



IRIS GRAPHICS, INCORPORATED

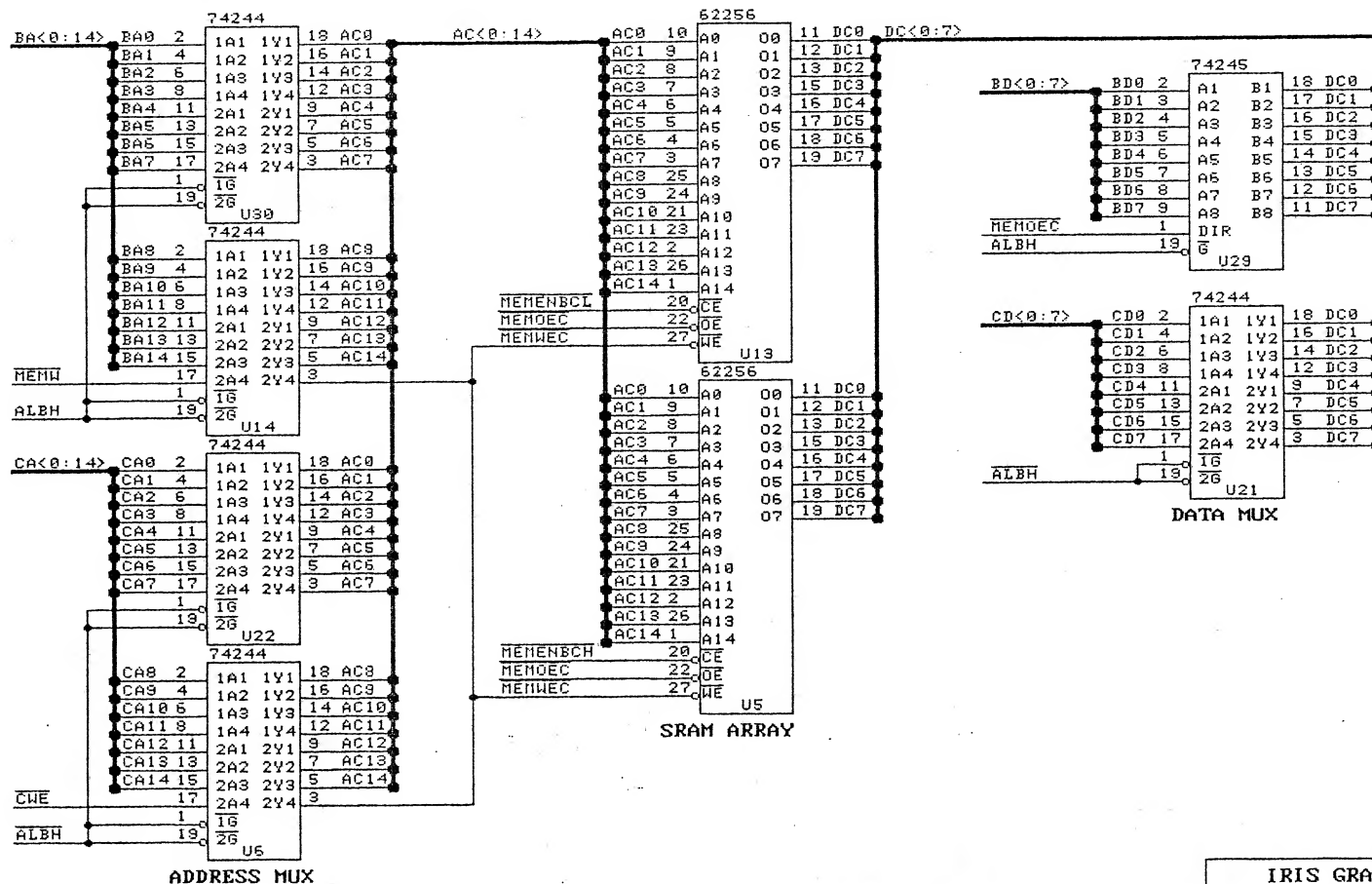
12 JACOB WAY, READING, MASS. 01867

TITLE SCEN BD PC
3000 TAPE INTERFACE

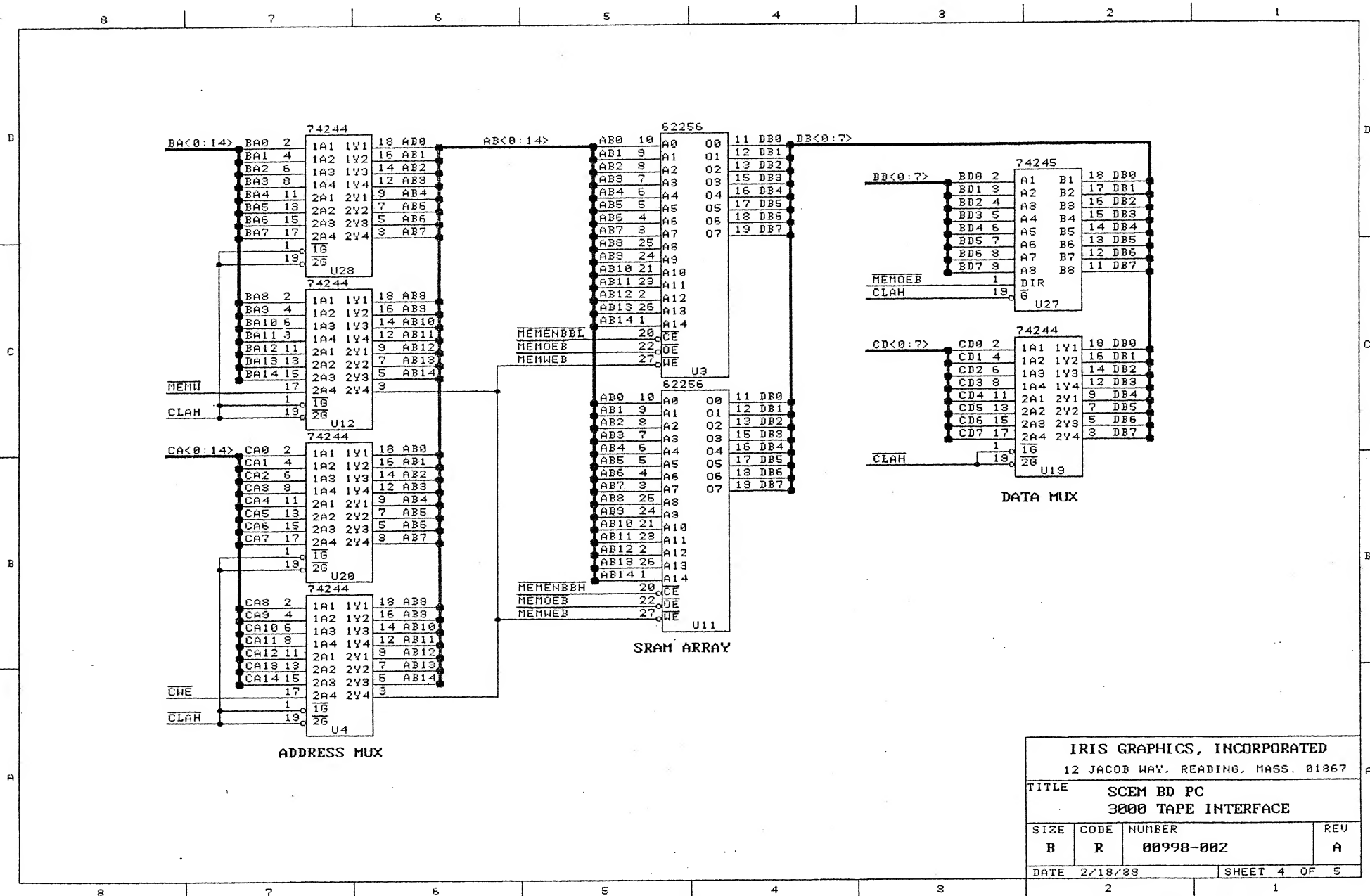
SIZE	CODE	NUMBER	REV
B	R	00998-002	A

DATE 2/18/88 SHEET 3 OF 5

FILE: \ROBBIE\RELEASED\INTR3000\TINTRFC3



IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC 3000 TAPE INTERFACE			
SIZE	CODE	NUMBER	REV
B	R	00998-002	A
DATE 2/18/88		SHEET 5 OF 5	



J23
F1 BD0
F2 BD1
F3 BD2
F4 BD3
F5 BD4
F6 BD5
F7 BD6
F8 BD7

J23
E16 PG8L
E17 PG8H
E18 PG9L
E19 PG9H
E1 BA0
E2 BA1
E3 BA2
E4 BA3
E5 BA4
E6 BA5
E7 BA6
E8 BA7
E9 BA8
E10 BA9
E11 BA10
E12 BA11
E13 BA12
E14 BA13
E15 BA14
E26 RST
E23 IOW
E22 IOR
E24 IOSS0
E25 PCLK

J23
E21 MEMR
E20 MEMW

+5V 1 R1 2 PUP1
1K

BD<0:7>

CA<0:15> CA15

BA<0:14>

FILE: \ALTERA\FMF3024\TDECODE

EP600
2 IN I/O 7 MEMENBAL
11 IN I/O 8 MEMENBAH
14 IN I/O 9 MEMOEA
23 IN I/O 10 BLCH
3 I/O I/O 15 MEMENBEL
4 I/O I/O 16 MEMENBEH
5 I/O I/O 17 MEMOEB
6 I/O I/O 18 CLAH
13 CK1 I/O 19 MEMENBCL
1 CK2 I/O 20 MEMENBCH
13 CK2 I/O 21 MEMOEC
13 CK2 I/O 22 ALBH

7414 8 ALBH
7414 11 BLCH
7414 12 CLAH
U49D
U49E
U49F

74139
1 16 V0
2 A V1
3 B V2
U50A V3

74138
4 62A V0
5 62B V1
6 61 V2
3 C V3
2 B V4
1 A V5
U41 V6
V7

82C55
D0 PA0 4 SEL1
D1 PA1 3 SEL2
D2 PA2 2 CN0
D3 PA3 1 CN1
D4 PA4 40
D5 PA5 39 REP0C
D6 PA6 38 REP1C
D7 PA7 37 REP2C
P0 PB0 18 GO
P1 PB1 19 ERASE
P2 PB2 20 REH
P3 PB3 21 WFM
P4 PB4 22 REU
P5 PB5 23 FEN
P6 PB6 24 CHER
P7 PB7 25 PRICVC
PC0 PC0 14 ID0
PC1 PC1 15 ID1
PC2 PC2 16
PC3 PC3 17 FBV
PC4 PC4 13 FMK
PC5 PC5 12 HER
PC6 PC6 11 DBV
PC7 PC7 10 RBY

IOS	I/O PORT
30	DIS255 PORT A
31	DIS255 PORT B
32	DIS255 PORT C
33	DIS255 CONTROL
34	LOW ADDRESS COUNT
35	HIGH ADDRESS COUNT
36	CONTROL REGISTER

7408 3 REP0
7408 6 REP1
7408 8 REP2
US1A
US1B
US1C

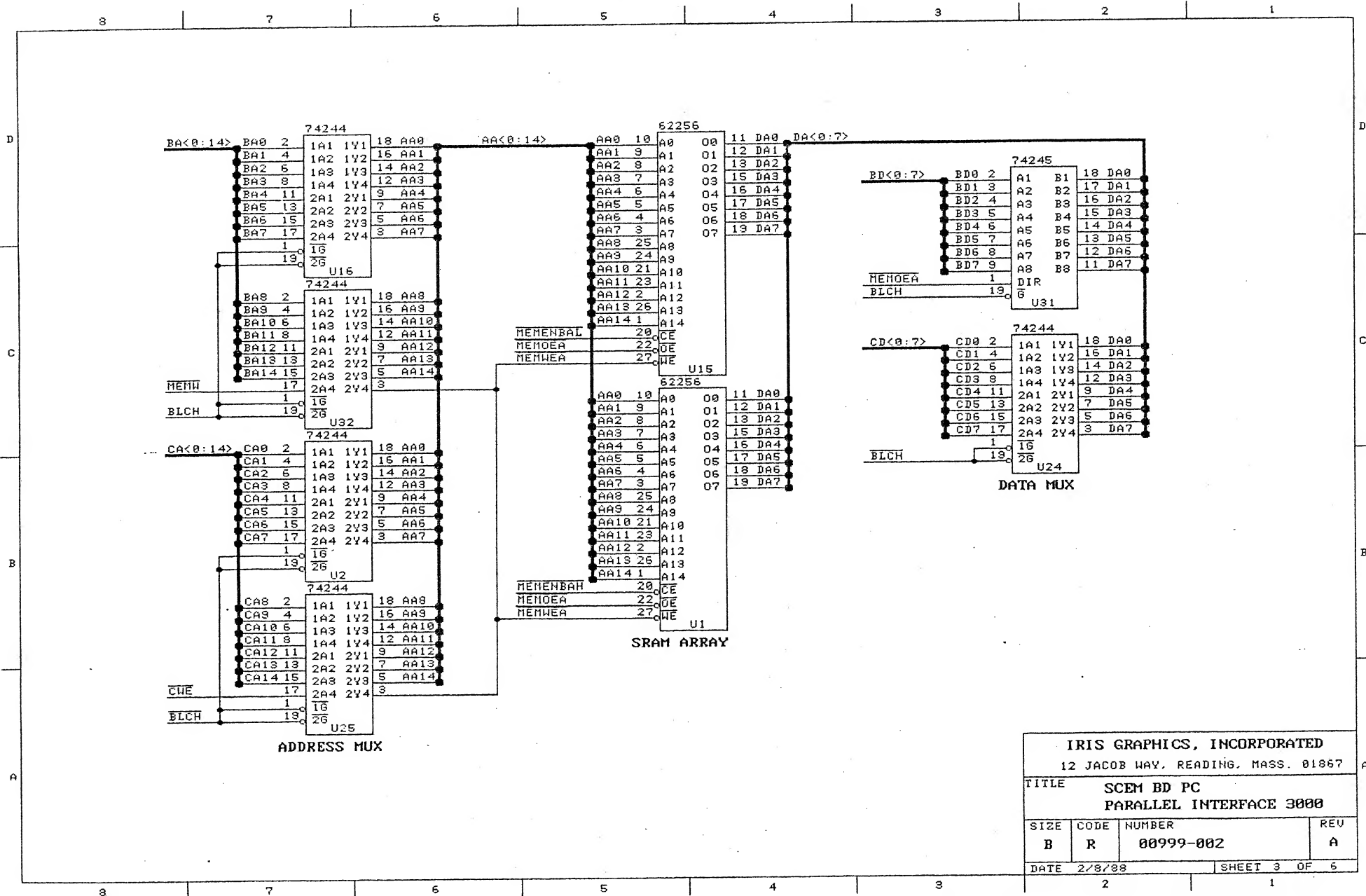
EP600
7 OUT 7 BUSV
8 OUT 8 DONE
11 IN I/O 9
14 IN I/O 10
23 IN I/O 15 CNT0
3 IN OUT 16 CNT1
4 IN OUT 17 HDR
5 OUT I/O 18
6 OUT I/O 19
6 OUT I/O 20
1 CK1 OUT 21 ACLK
13 CK2 IN 22 E0BUFF
U43

FILE: \ALTERA\FMF3024\NICTRL2

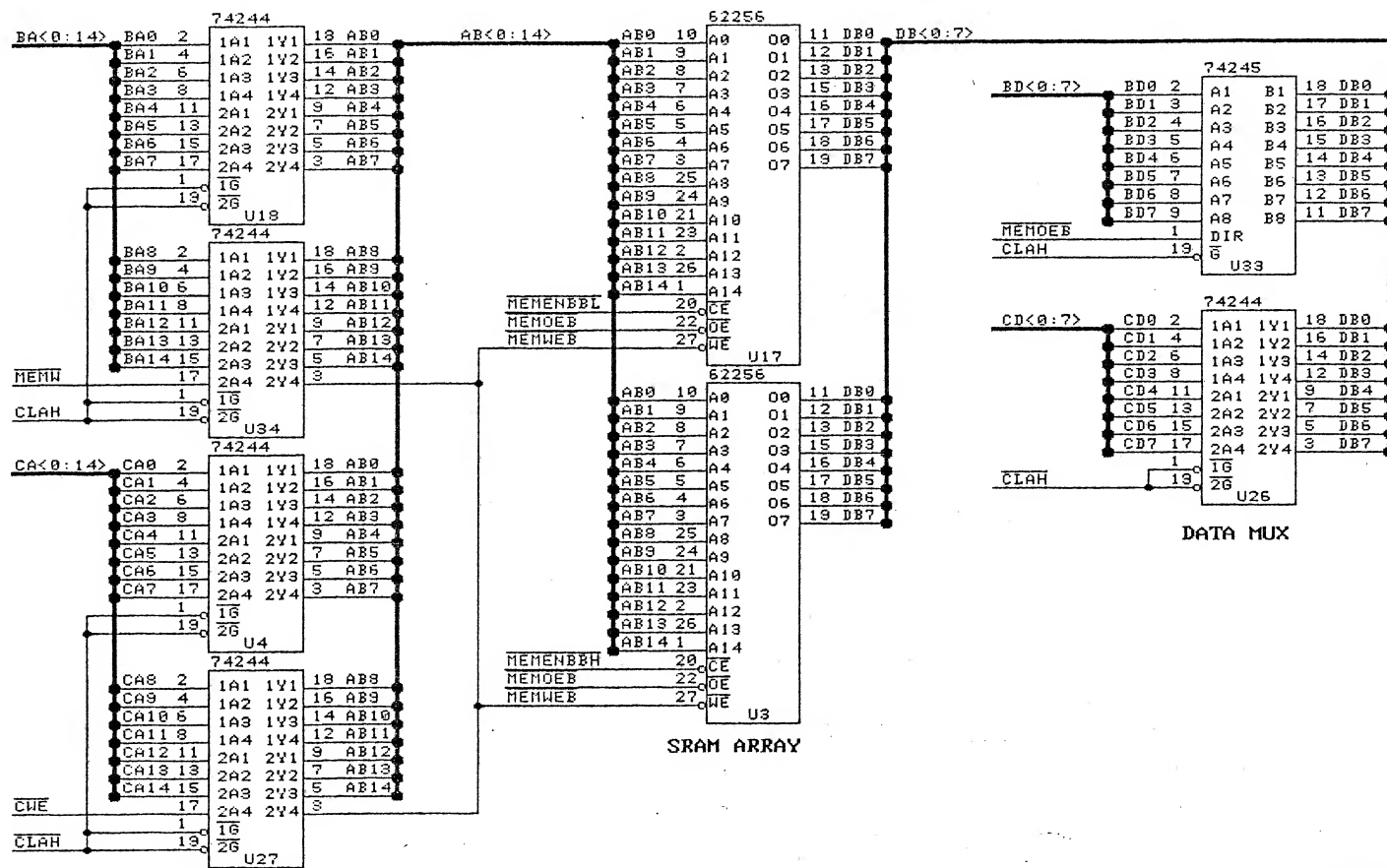
NOTE - REV 03 CHANGES THE SIGNAL "HDR" TO "/HDR", AND THE SIGNALS "/REPnC" AND "/REPn" TO "REPnC" AND "REPn" (i.e. delete inversions). U4 IS CHANGED TO A 74LS08 FROM AN LS32 FOR COMPATIBILITY W/ THE NON-INVERTED SIGNALS. U2A (LS14) IS NO LONGER NEEDED TO INVERT THE INPUT TO U12-15 (LS139) AND INSTEAD OF USING U4D (was LS32) TO GATE THE CLOCK TO U16-1, "E0BUFF" GOES TO THE EPLD @ U5 WHICH GENERATES THE CLOCK (ACLK) FOR U16-1. REV 04 CHANGES "CK2" TO EPLD (U5-13) USED, AS CLOCK FOR "CNT0", "CNT1", AND "/HDR", FROM "/RSTR" TO "/CHE" SO THAT "REP0.1,2 DO NOT SWITCH PREMATURELY CAUSING THE 4TH BYTE OF THE PREAMBLE TO BE REPLICATED.

IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC			
PARALLEL INTERFACE 3000			
SIZE	CODE	NUMBER	REV
B	R	00999-002	A
DATE 2/8/89		SHEET 1 OF 6	

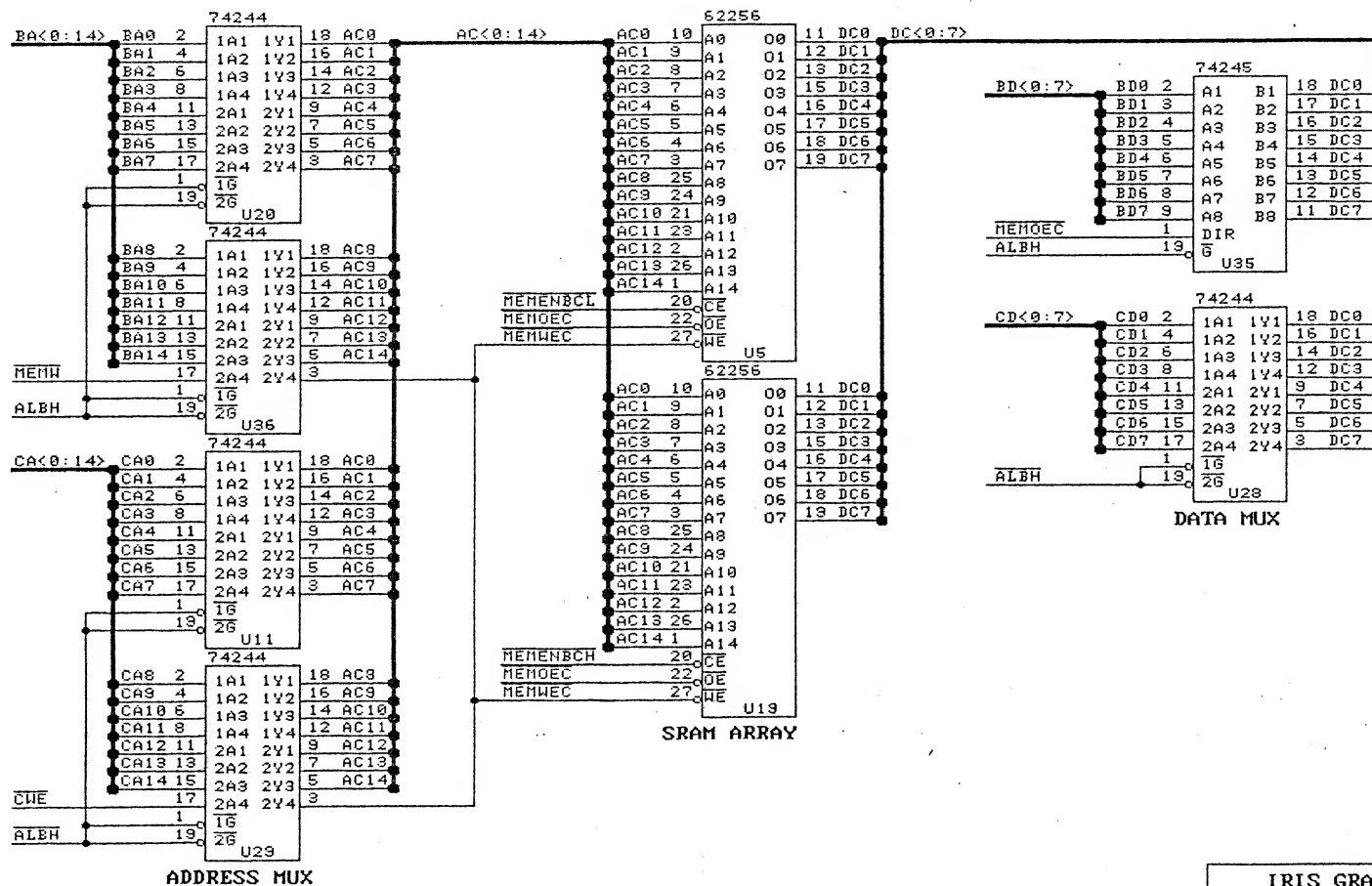
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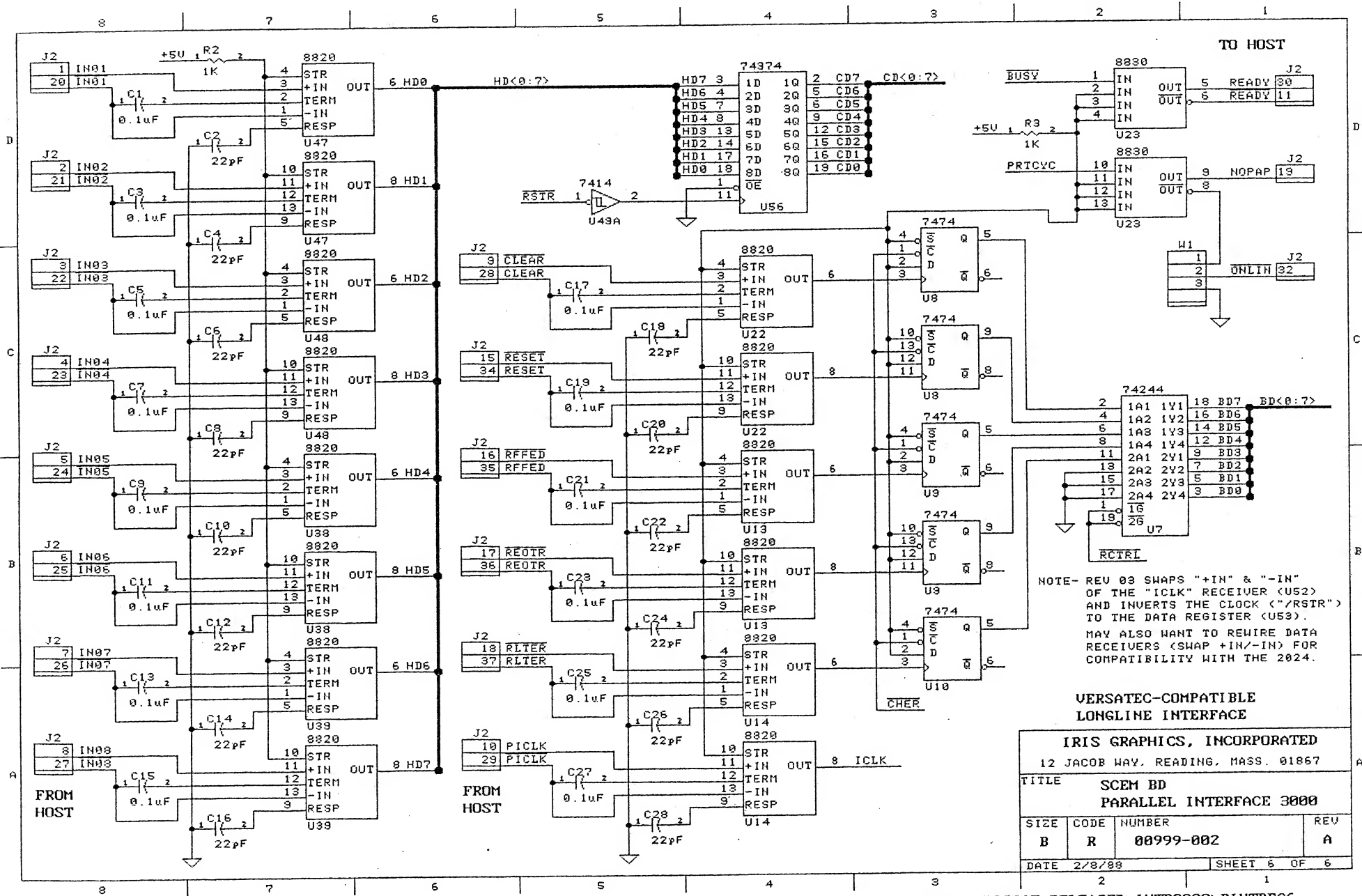
FILE: \ROBBIE\RELEASED\INTR3000\PINTRFC3

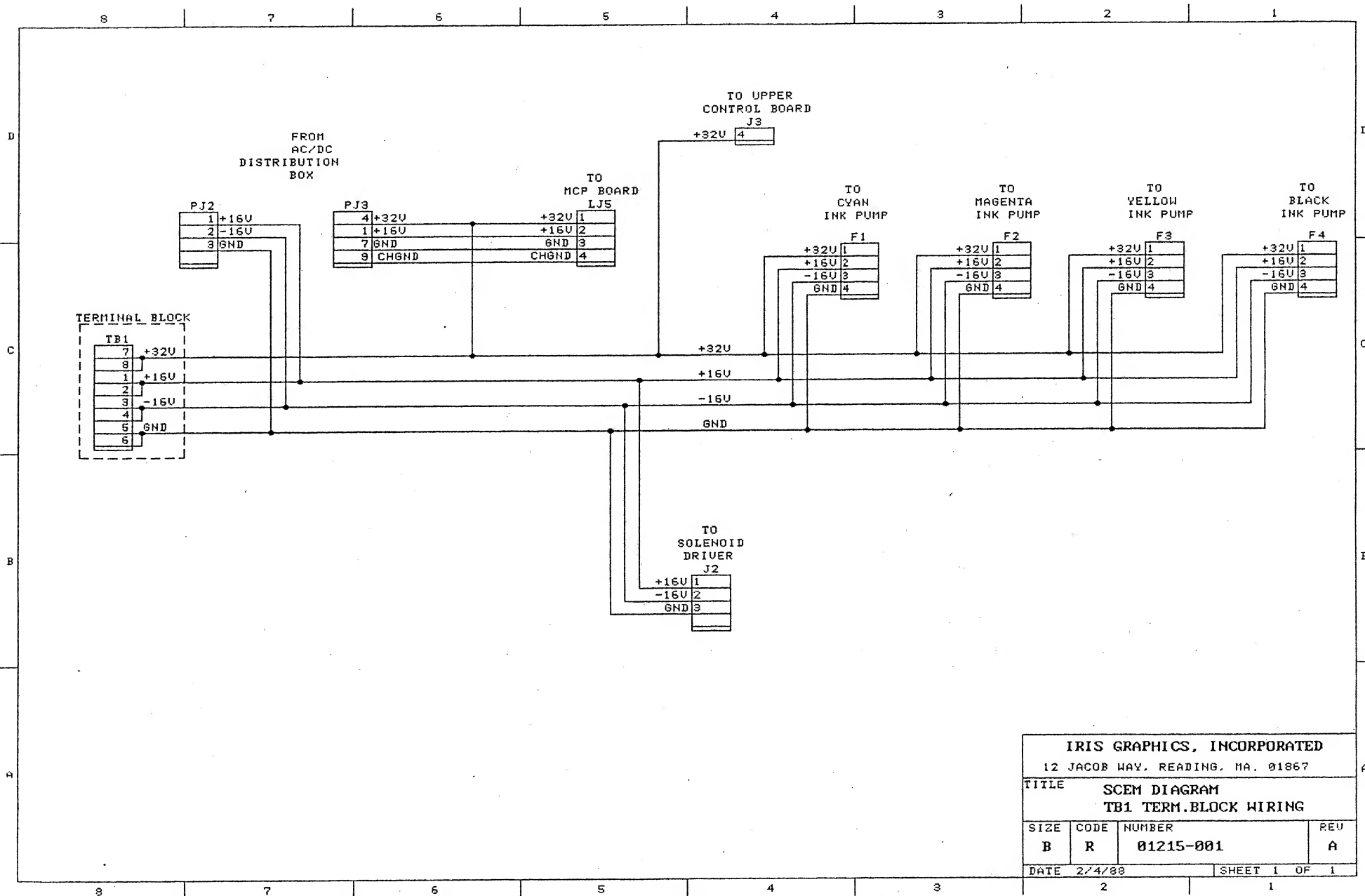


IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC PARALLEL INTERFACE 3000			
SIZE	CODE	NUMBER	REV
B	R	00999-002	A
DATE 2/8/88		SHEET 4 OF 6	



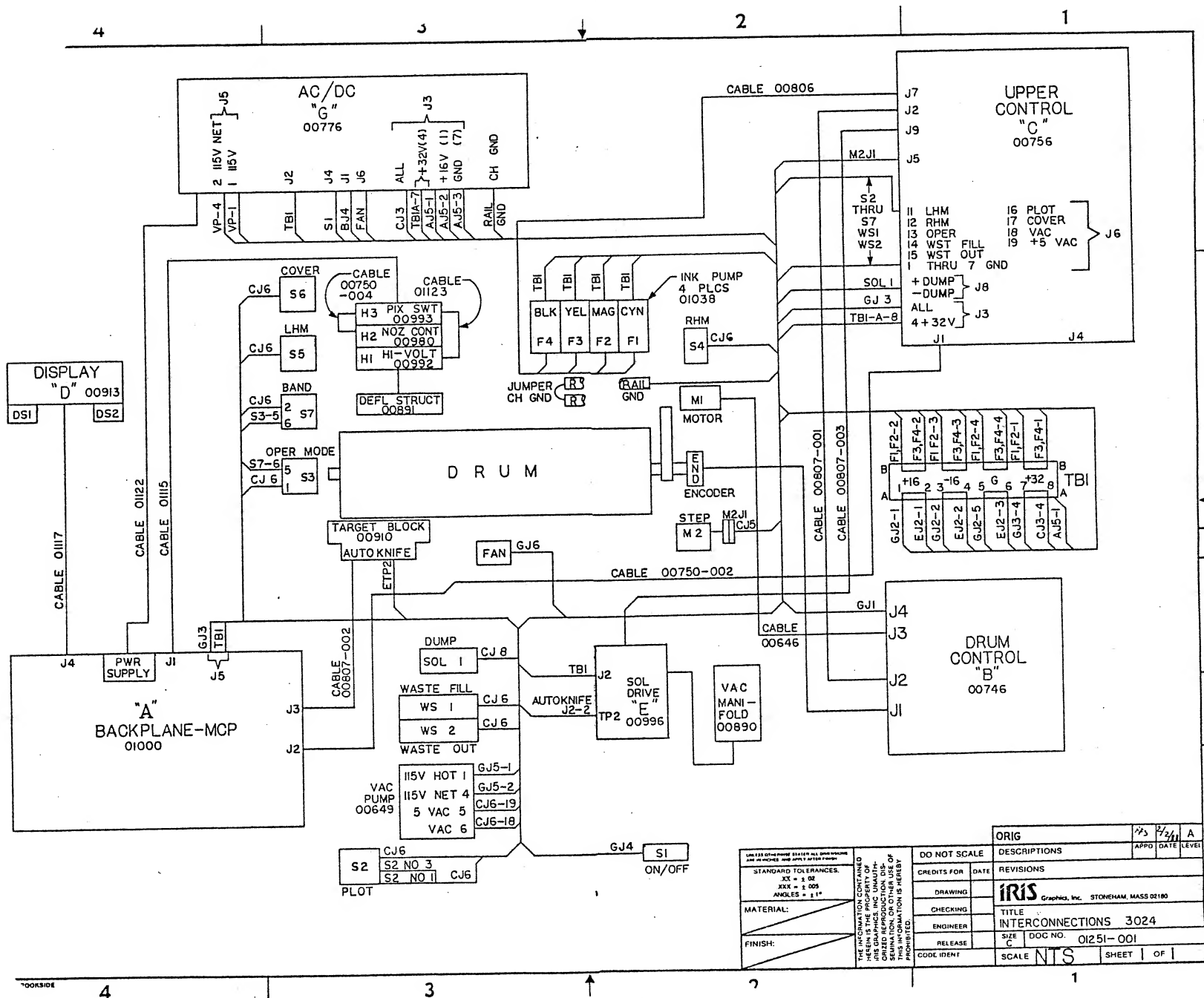
IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC PARALLEL INTERFACE 3000			
SIZE	CODE	NUMBER	REV
B	R.	00999-002	A
DATE 2/3/88		SHEET 5 OF 6	





IRIS GRAPHICS, INCORPORATED			
12 JACOB WAY, READING, MA. 01867			
TITLE SCEN DIAGRAM			
TB1 TERM.BLOCK WIRING			
SIZE	CODE	NUMBER	REV
B	R	01215-001	A
DATE 2/4/88		SHEET 1 OF 1	

FILE: \ROBBIE\RELEASED\WIREDIA\TB1WRDIA

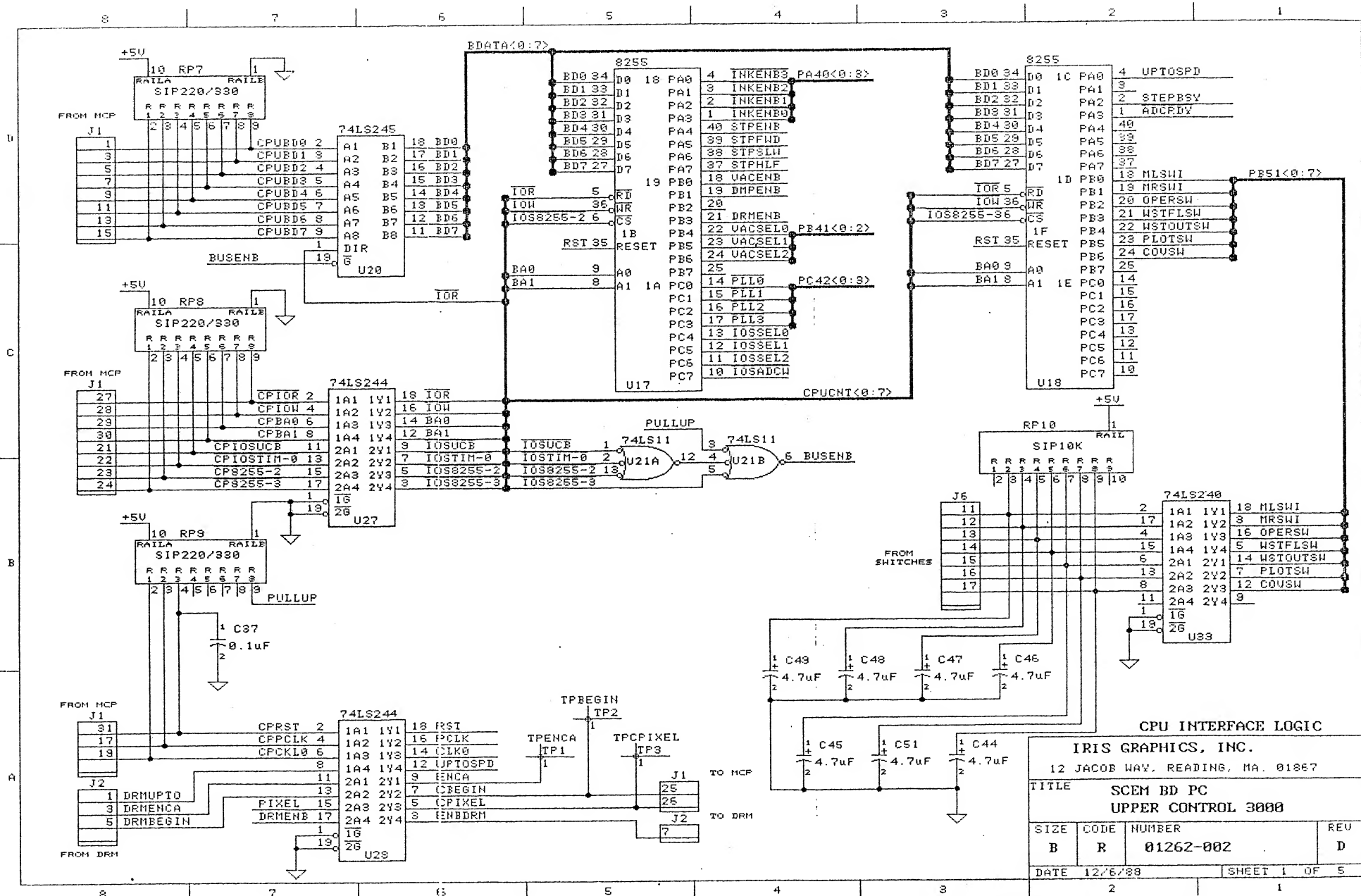


UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES AND DECIMAL EQUIVALENTS.
 STANDARD TOLERANCES:
 XX = ± .02
 XXX = ± .005
 ANGLES = ± 1°

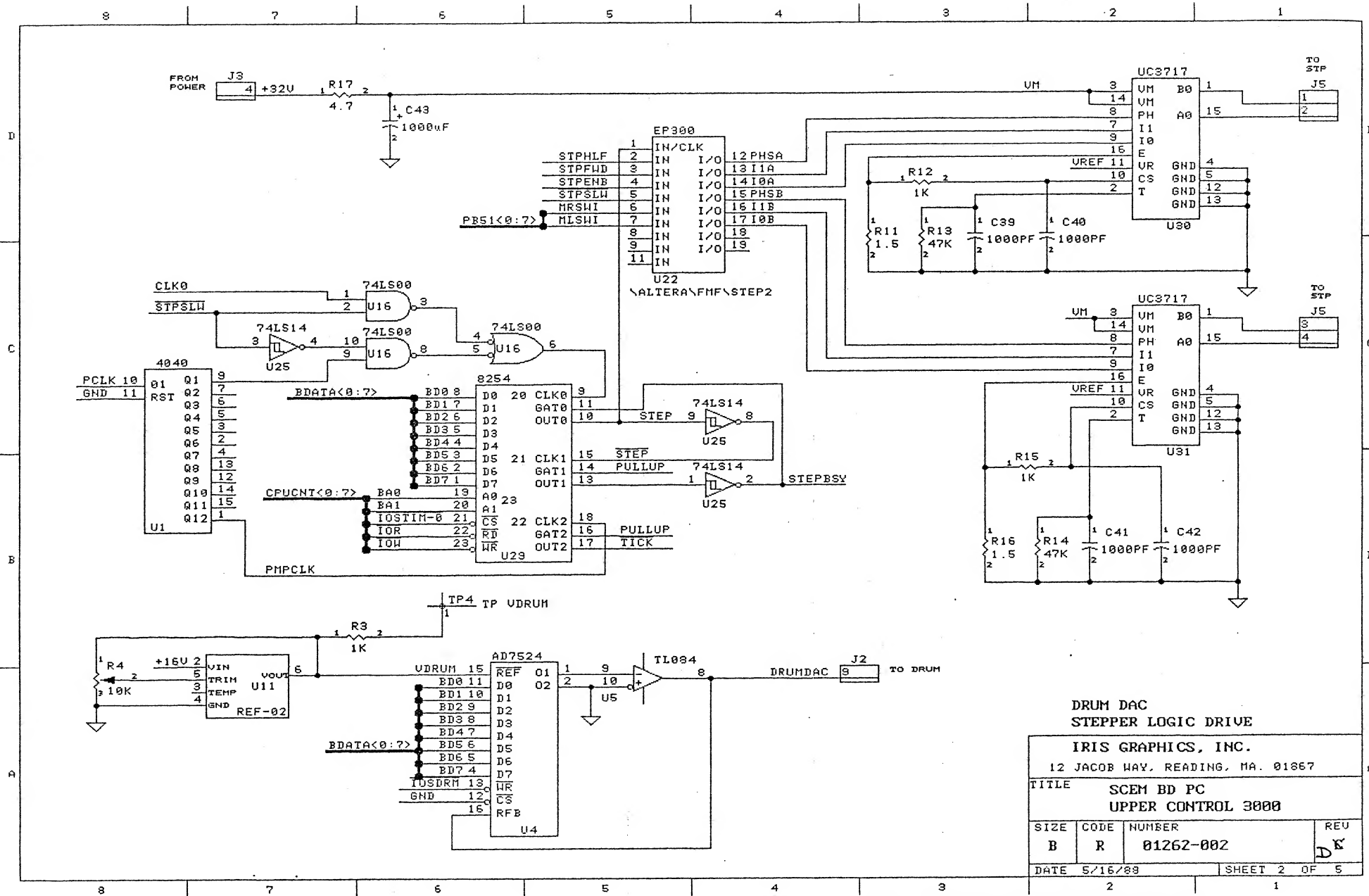
MATERIAL:
 FINISH:

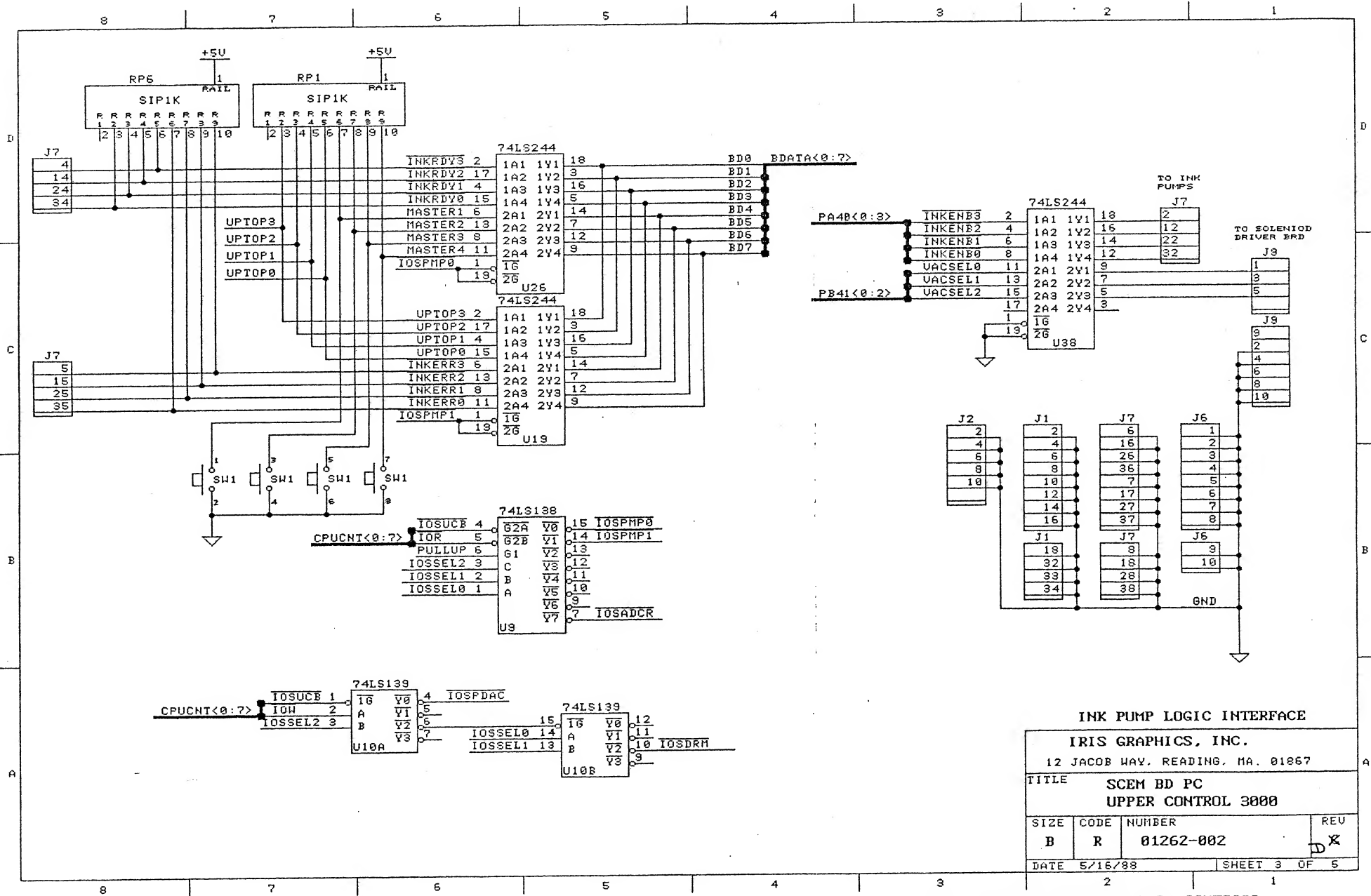
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DO NOT SCALE	ORIG	APPRO	DATE	LEVEL
CREDITS FOR	DESCRIPTIONS			
DRAWING	IRIS			
CHECKING	Graphics, Inc.			
ENGINEER	STONEHAM, MASS 02180			
RELEASE	TITLE			
CODE IDENT	INTERCONNECTIONS 3024			
	SIZE			
	DOG NO.			
	01251-001			
	SCALE			
	NTS			
	SHEET			
	1 OF 1			



FILE: \ROBBIE\RELEASED\3024\CONT3001

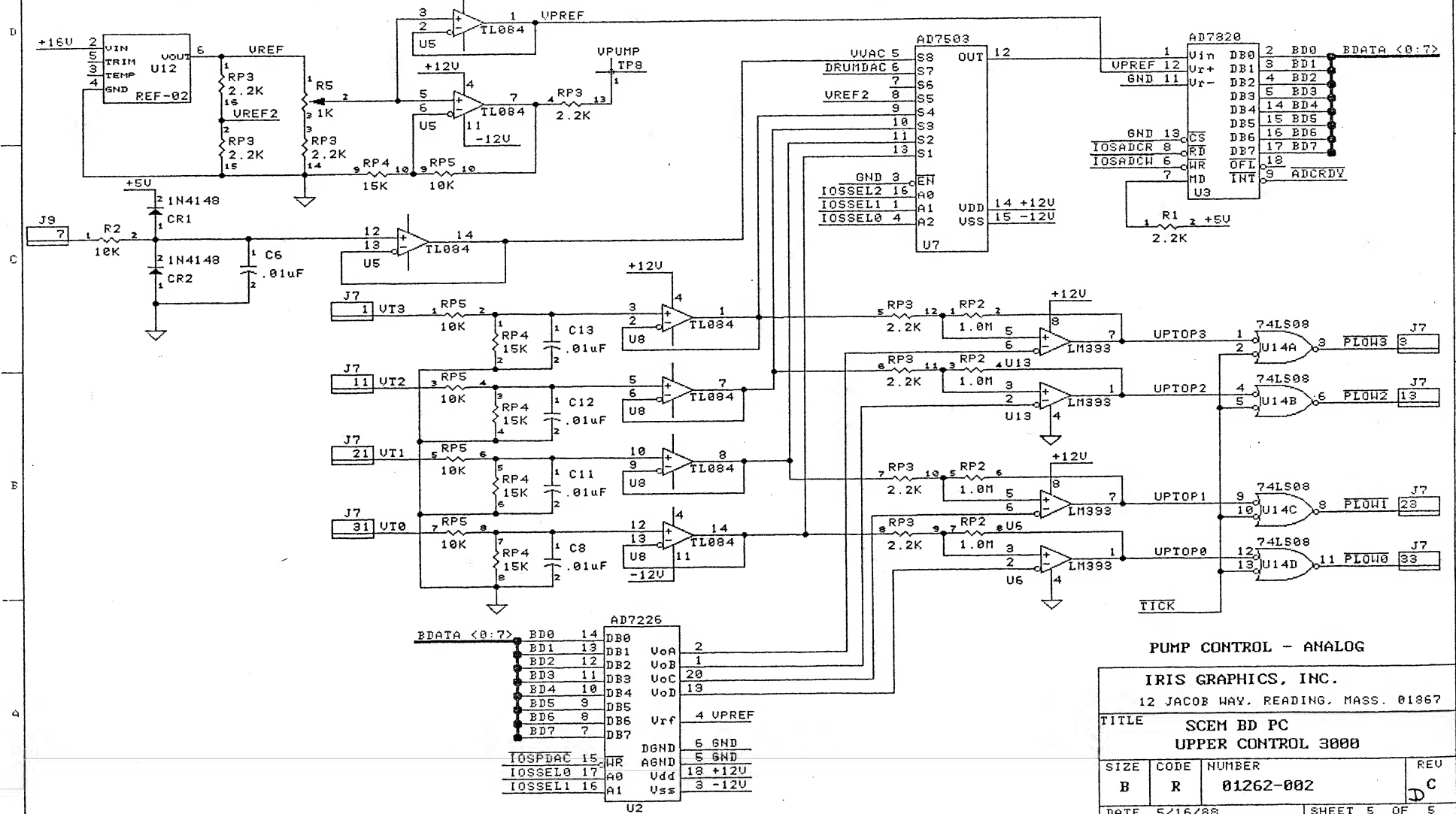




FILE: \ROBBIE\RELEASED\3024\CONT3003

NOTE: To calibrate so that 1LSB (when reading pump pressure) equals 3psi. . . set R5 to read 7.68V at TP UPUMP. . . UPREF should then be 4.608V. . . at this setting UREF2 should read as [UREF2]=189. Be careful reading UVAC & DRUMDAC since these readings will vary with the setting of R5. If absolute readings are needed, the values read should be scaled as follows: [UVAC]~[UVAC]/[UREF2]=value which would be read if Ur+ input to 7820 were UREF instead of UPREF.

NOTE: RP2 BOURNS 4308R-102
RP4,5 BOURNS 4310R-102
RP3 DALE MDP1063



PUMP CONTROL - ANALOG

IRIS GRAPHICS, INC.

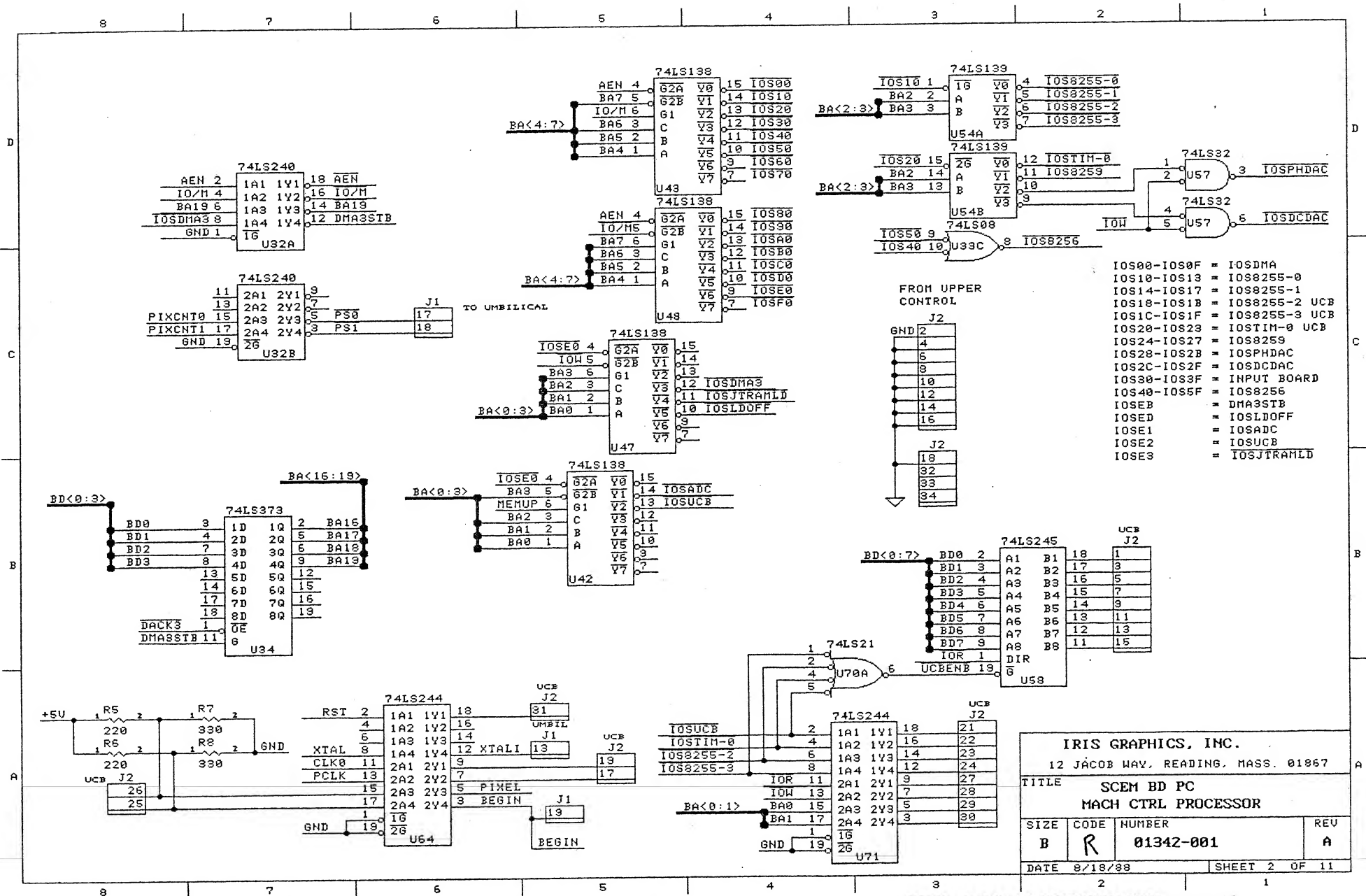
12 JACOB WAY, READING, MASS. 01867

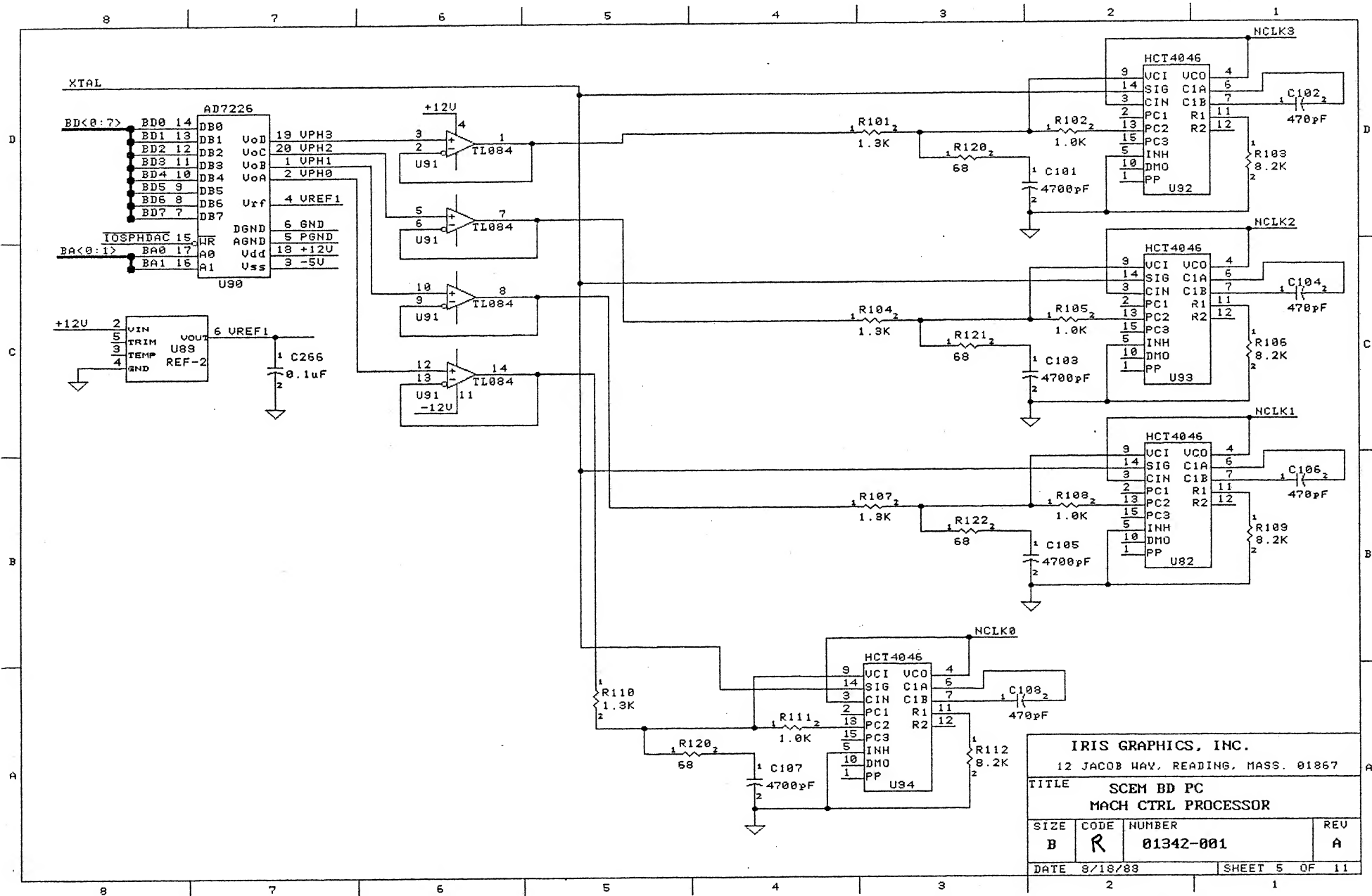
TITLE SCEN BD PC
UPPER CONTROL 3000

SIZE	CODE	NUMBER	REV
B	R	01262-002	D

DATE 5/16/88 SHEET 5 OF 5

FILE: \ROBBIE\RELEASE\3024\CONT3005



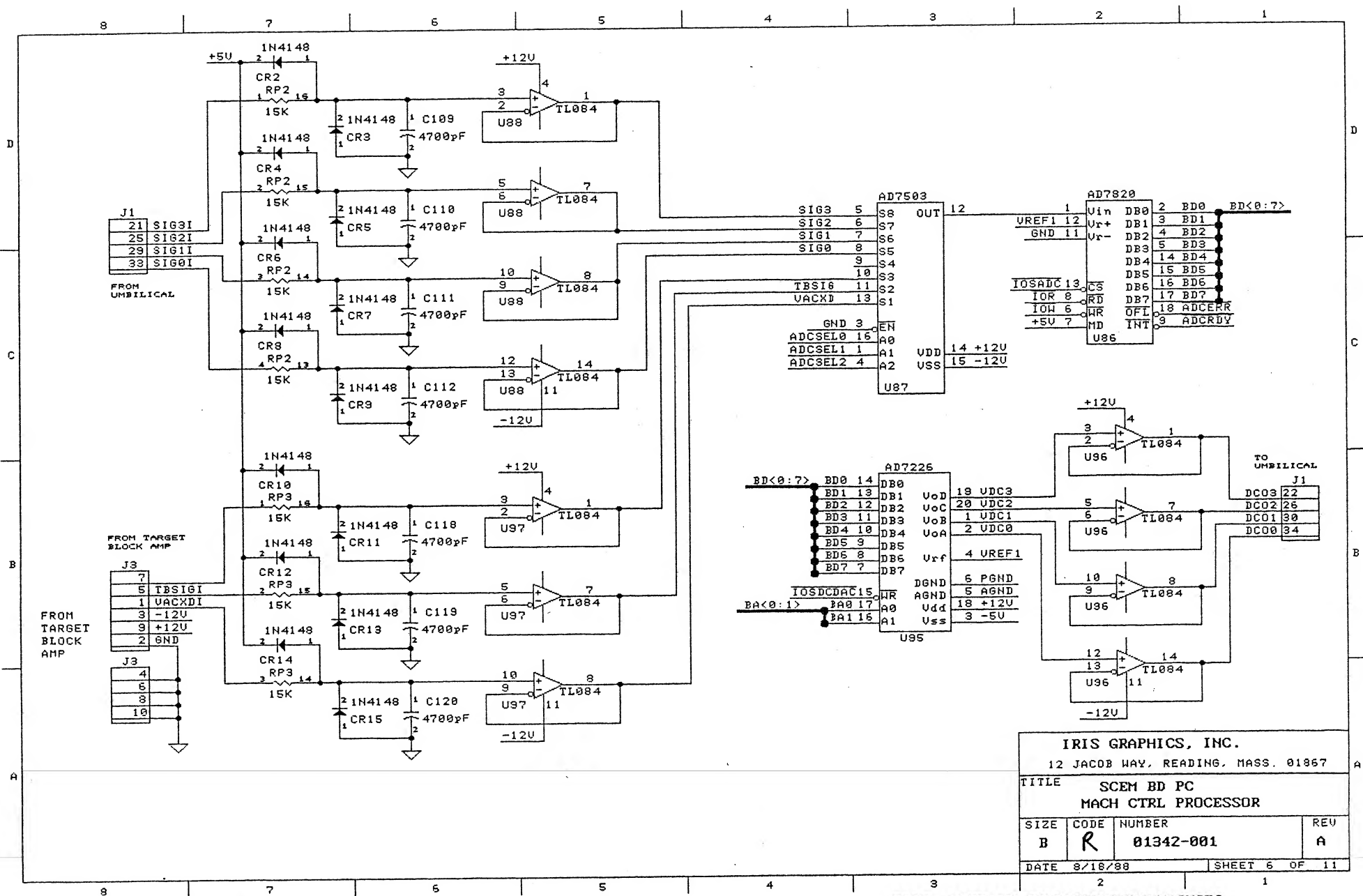


IRIS GRAPHICS, INC.
 12 JACOB WAY, READING, MASS. 01867

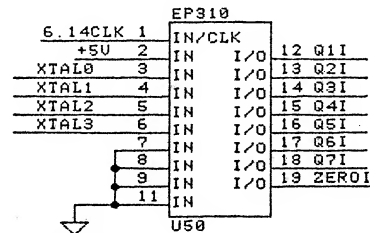
TITLE SCHEM BD PC
 MACH CTRL PROCESSOR

SIZE	CODE	NUMBER	REV
B	R	01342-001	A

DATE 8/18/88 SHEET 5 OF 11

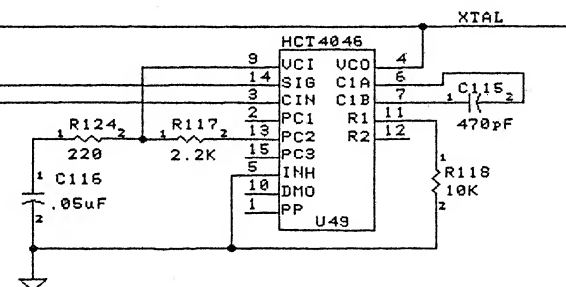
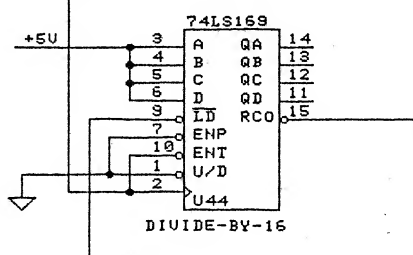


FILE: \ALTERA\FMF\DIU93-108



FOR F(CLOCK) = 5.144 MHz

F(XTAL)	FREQ. #
1057 KHz	16
1046	15
1035	14
1024	13
1013	12
1003	11
993	10
983	9
973	8
964	7
954	6
945	5
936	4
927	3
919	2
910	1



XTAL GENERATOR CIRCUIT

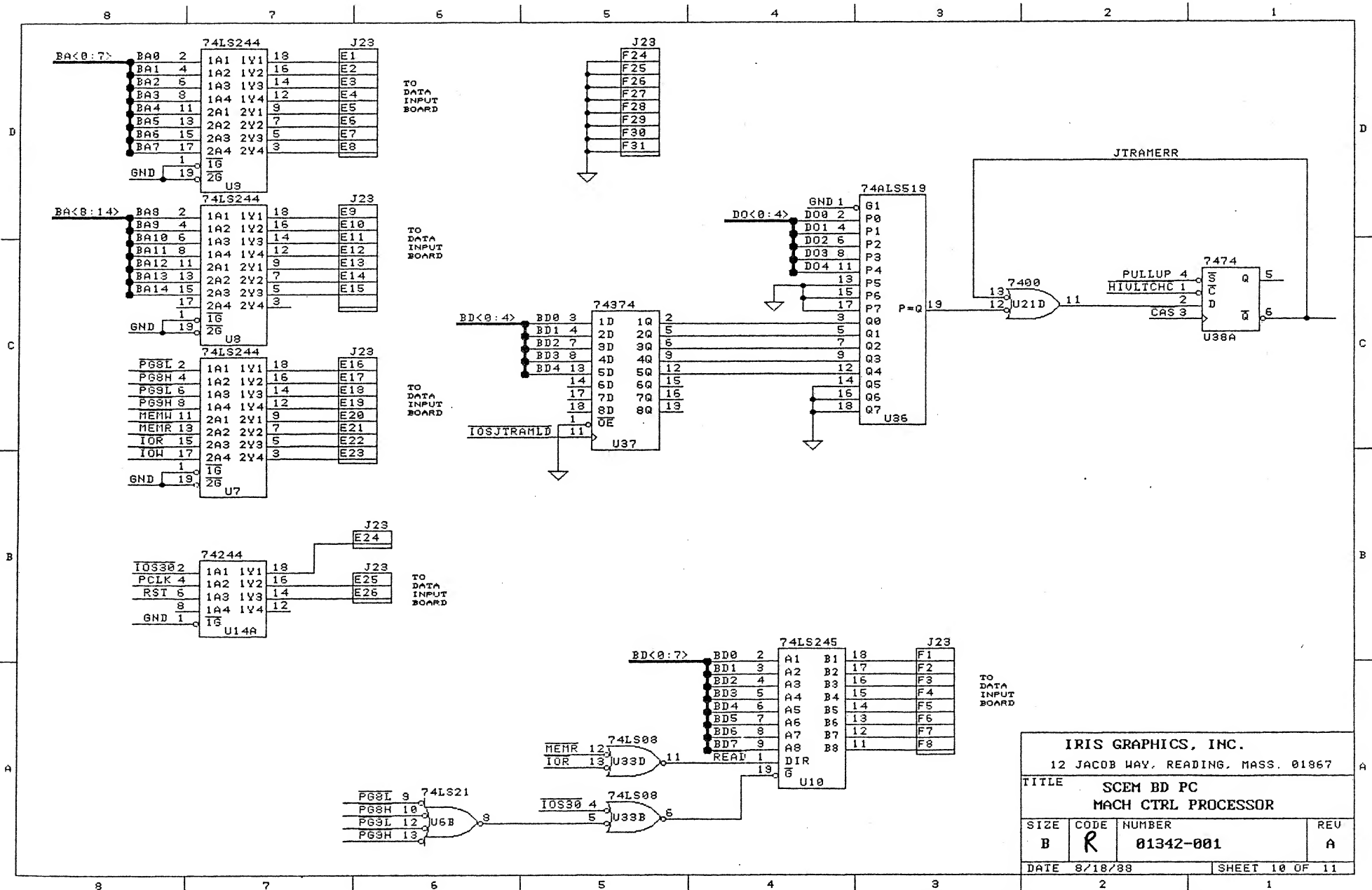
IRIS GRAPHICS, INC.

12 JACOB WAY, READING, MASS. 01867

TITLE SCEN BD PC
MACH CTRL PROCESSOR

SIZE	CODE	NUMBER	REV
B	R	01342-001	A
DATE	8/18/88	SHEET 9 OF 11	

FILE: \ROBBIE\RELEASED\3024\MACHCP9



* NOTE: CONNECTORS J10A AND J10B
THRU J17A AND J17B
ARE WIRED AS SHOWN BELOW.

J10 ... J17

J10A	A1	I/OCHCK
J10B	A2	SD7
J10C	A3	SD6
J10D	A4	SD5
J10E	A5	SD4
J10F	A6	SD3
J10G	A7	SD2
J10H	A8	SD1
J10I	A9	SD0
J10J	A10	I/OCHRDY
J10K	A11	PCREH
J10L	A12	SA19
J10M	A13	SA18
J10N	A14	SA17
J10P	A15	SA16
J10R	A16	SA15
J10S	A17	SA14
J10T	A18	SA13
J10V	A19	SA12
J10W	A20	SA11
J10X	A21	SA10
J10Y	A22	SA9
J10Z	A23	SA8
J11A	A24	SA7
J11B	A25	SA6
J11C	A26	SA5
J11D	A27	SA4
J11E	A28	SA3
J11F	A29	SA2
J11G	A30	SA1
J11H	A31	SA0

J17A	B1	GND
J17B	B2	RESETDRU
J17C	B3	+5V
J17D	B4	PCIRQ9
J17E	B5	-5V
J17F	B6	PCDRQ2
J17G	B7	-12V
J17H	B8	OWS
J17I	B9	+12V
J17J	B10	GND
J17K	B11	SHEMW
J17L	B12	SHEMR
J17M	B13	PCIOR
J17N	B14	PCIOR
J17P	B15	PCDACK3
J17R	B16	PCDRQ3
J17S	B17	PCDACK1
J17T	B18	PCDRQ1
J17V	B19	REFRESH
J17W	B20	CLK
J17X	B21	PCIRQ7
J17Y	B22	PCIRQ6
J17Z	B23	PCIRQ5
J18A	B24	PCIRQ4
J18B	B25	PCIRQ3
J18C	B26	PCDACK2
J18D	B27	T/C
J18E	B28	BALE
J18F	B29	+5V
J18G	B30	OSC
J18H	B31	GND

*NOTE: CONNECTORS J18C AND J18D
THRU J21C AND J21D
ARE WIRED AS SHOWN BELOW.

J18 ... J21

J18C	C1	SBHE
J18D	C2	LA23
J18E	C3	LA22
J18F	C4	LA21
J18G	C5	LA20
J18H	C6	LA19
J18I	C7	LA18
J18J	C8	LA17
J18K	C9	PCMEMR
J18L	C10	PCMEMW
J18M	C11	SD08
J18N	C12	SD09
J18P	C13	SD10
J18R	C14	SD11
J18S	C15	SD12
J18T	C16	SD13
J18V	C17	SD14
J18W	C18	SD15

J21C	D1	MEMCS16
J21D	D2	I/OCS16
J21E	D3	PCIRQ10
J21F	D4	PCIRQ11
J21G	D5	PCIRQ12
J21H	D6	PCIRQ13
J21I	D7	PCIRQ14
J21J	D8	PCDACK0
J21K	D9	PCREQ0
J21L	D10	PCDACK5
J21M	D11	PCDRQ5
J21N	D12	PCDACK6
J21P	D13	PCDRQ6
J21R	D14	PCDACK7
J21S	D15	PCDRQ7
J21T	D16	+5V
J21V	D17	MASTER
J21W	D18	GND

FROM AC/DC
DISTRIBUTION

J5	1	+32V
J5	2	+16V
J5	3	GND
J5	4	CGND

TEST CONNECTOR

J26	1	CLKPHASE
J26	2	SIG0
J26	3	SIG1
J26	4	SIG2
J26	5	SIG3
J26	6	XTAL0
J26	7	XTAL1
J26	8	XTAL2
J26	9	XTAL3
J26	10	GND

FROM POWER SUPPLY

J8	1	POWEROK
J8	2	+5V
J8	3	+12V
J8	4	-12V
J8	5	GND
J8	6	GND

J9	1	GND
J9	2	GND
J9	3	-5V
J9	4	+5V
J9	5	+5V
J9	6	+5V

TO PIXEL SWITCH

J1	1	CGND
J1	2	+16V
J1	3	+32V
J1	37	+12V
J1	38	-12V
J1	39	+5V
J1	4	GND
J1	6	
J1	8	
J1	10	
J1	12	
J1	14	
J1	20	
J1	24	
J1	28	
J1	32	
J1	36	
J1	40	

* NOTE: C17,C18,C27,C28,C150-C241,
C250-C255,C184,C192 ARE 0.1uF DECOUPLING CAPACITORS.

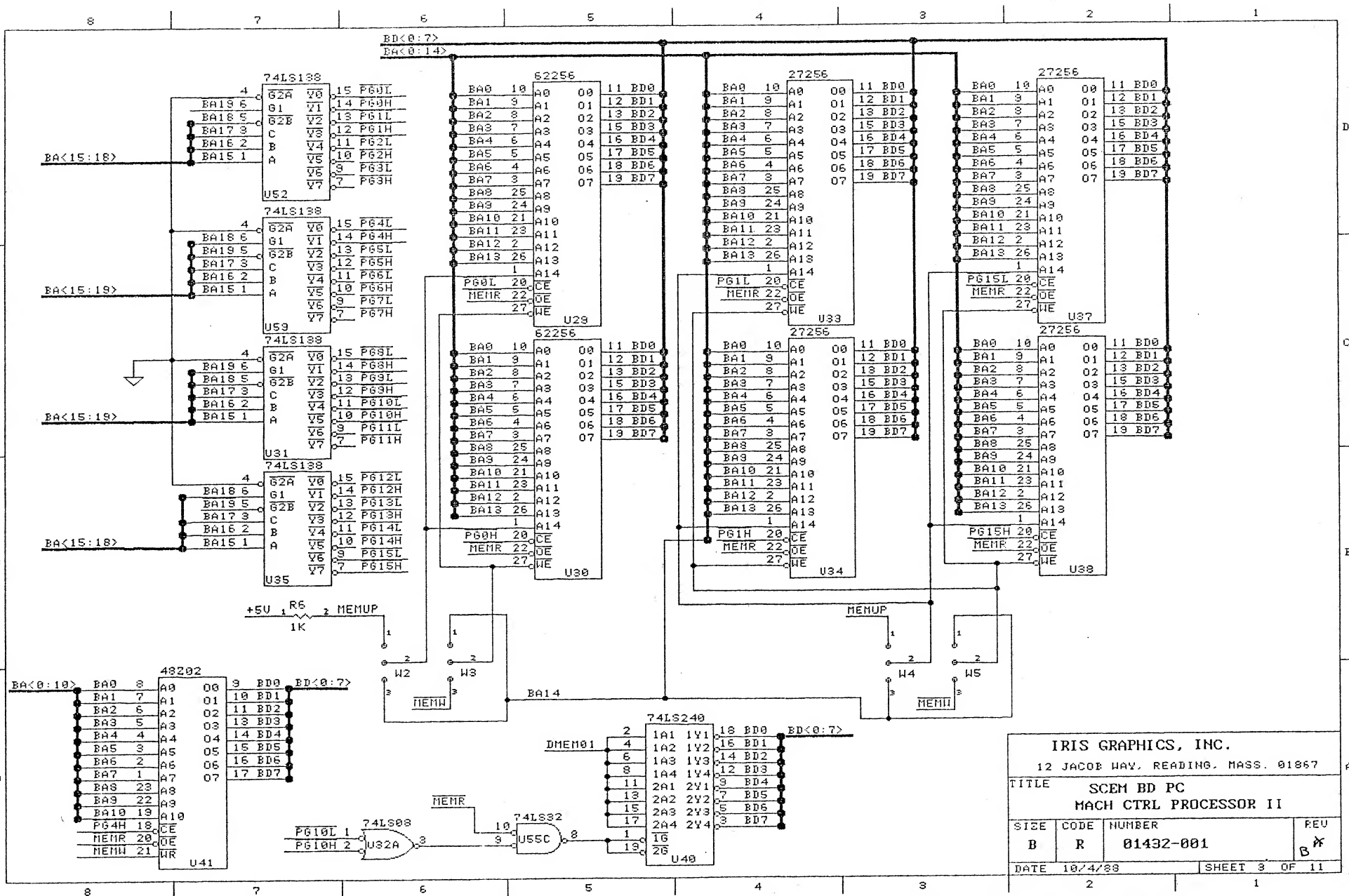
IRIS GRAPHICS, INC.

12 JACOB WAY, READING, MASS. 01867

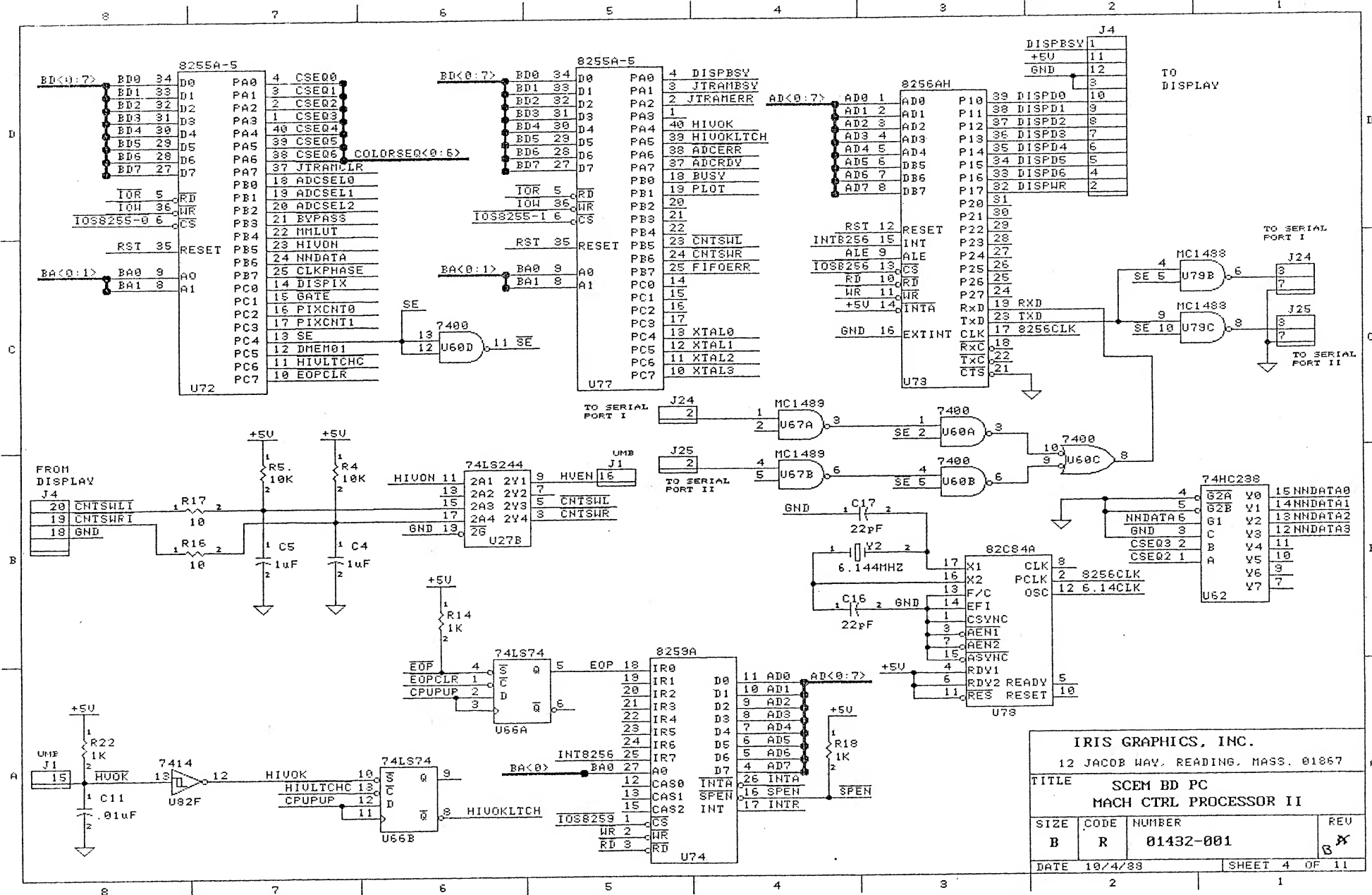
TITLE SCEM BD PC
MACH CTRL PROCESSOR

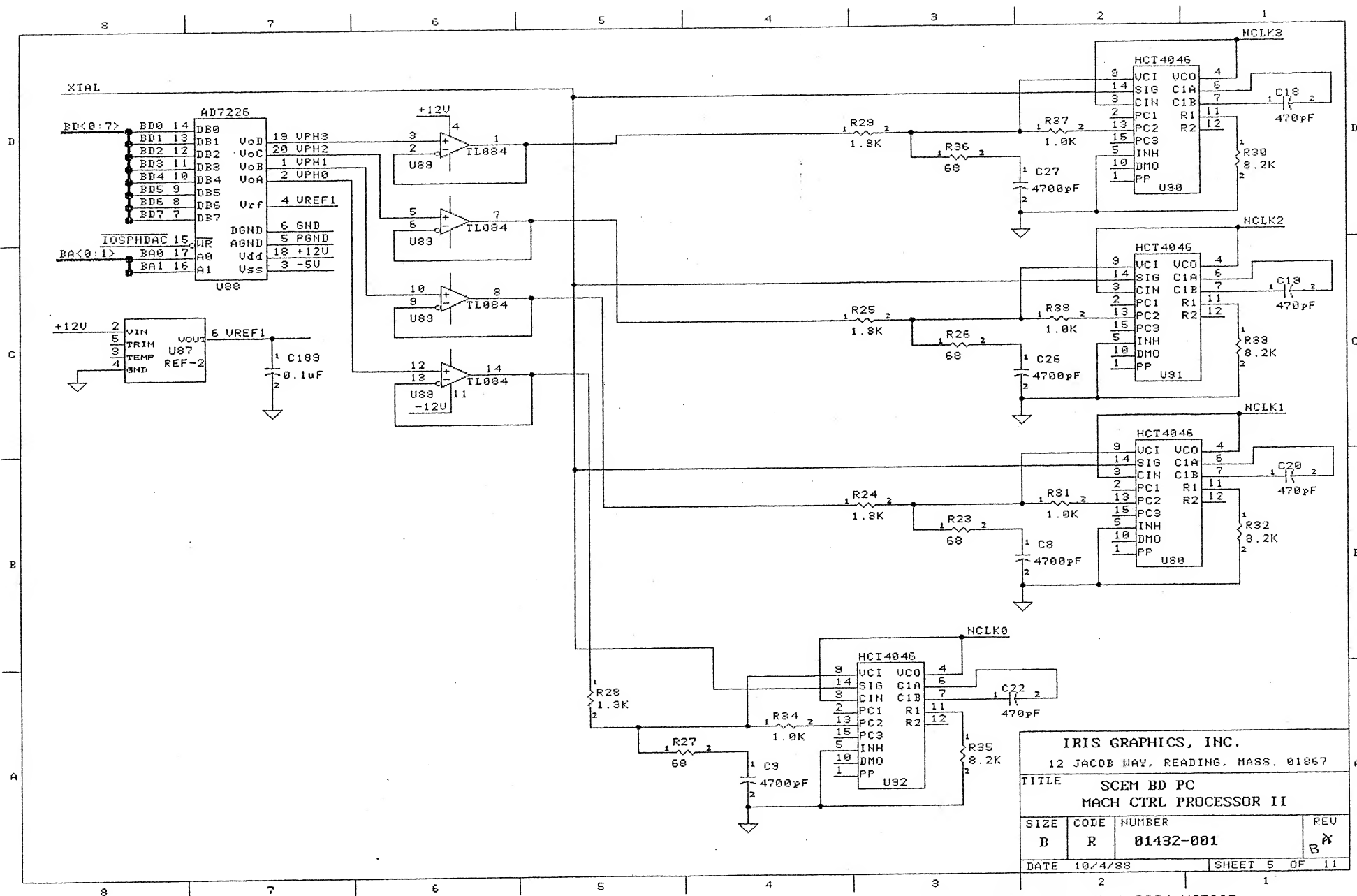
SIZE	CODE	NUMBER	REV
B	R	01342-001	A

DATE 8/18/88	SHEET 11 OF 11
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IRIS GRAPHICS, INC.			
12 JACOB WAY, READING, MASS. 01867			
TITLE SCEN BD PC			
MACH CTRL PROCESSOR II			
SIZE	CODE	NUMBER	REV
B	R	01432-001	B *
DATE 10/4/88		SHEET 3 OF 11	



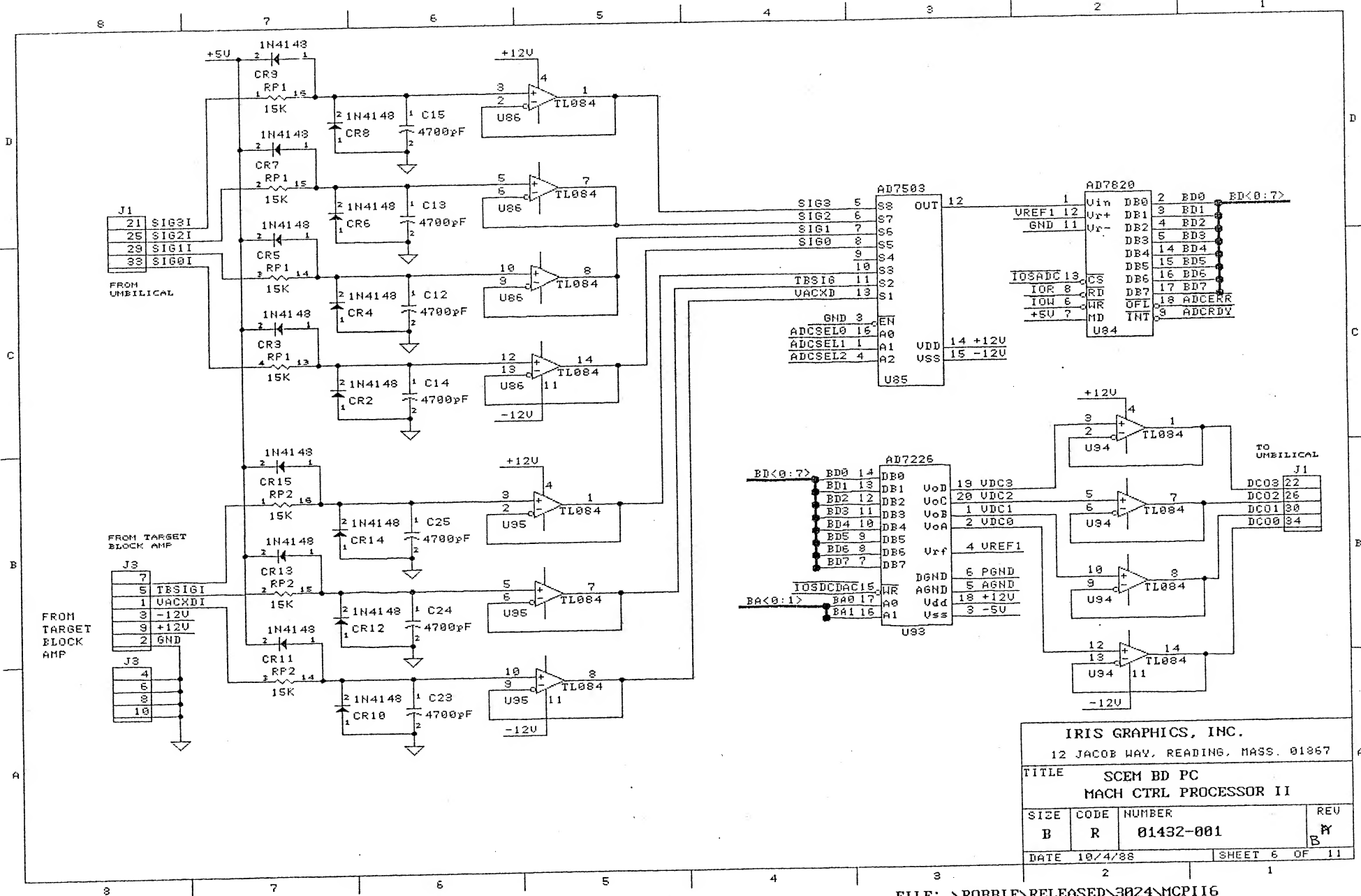


IRIS GRAPHICS, INC.

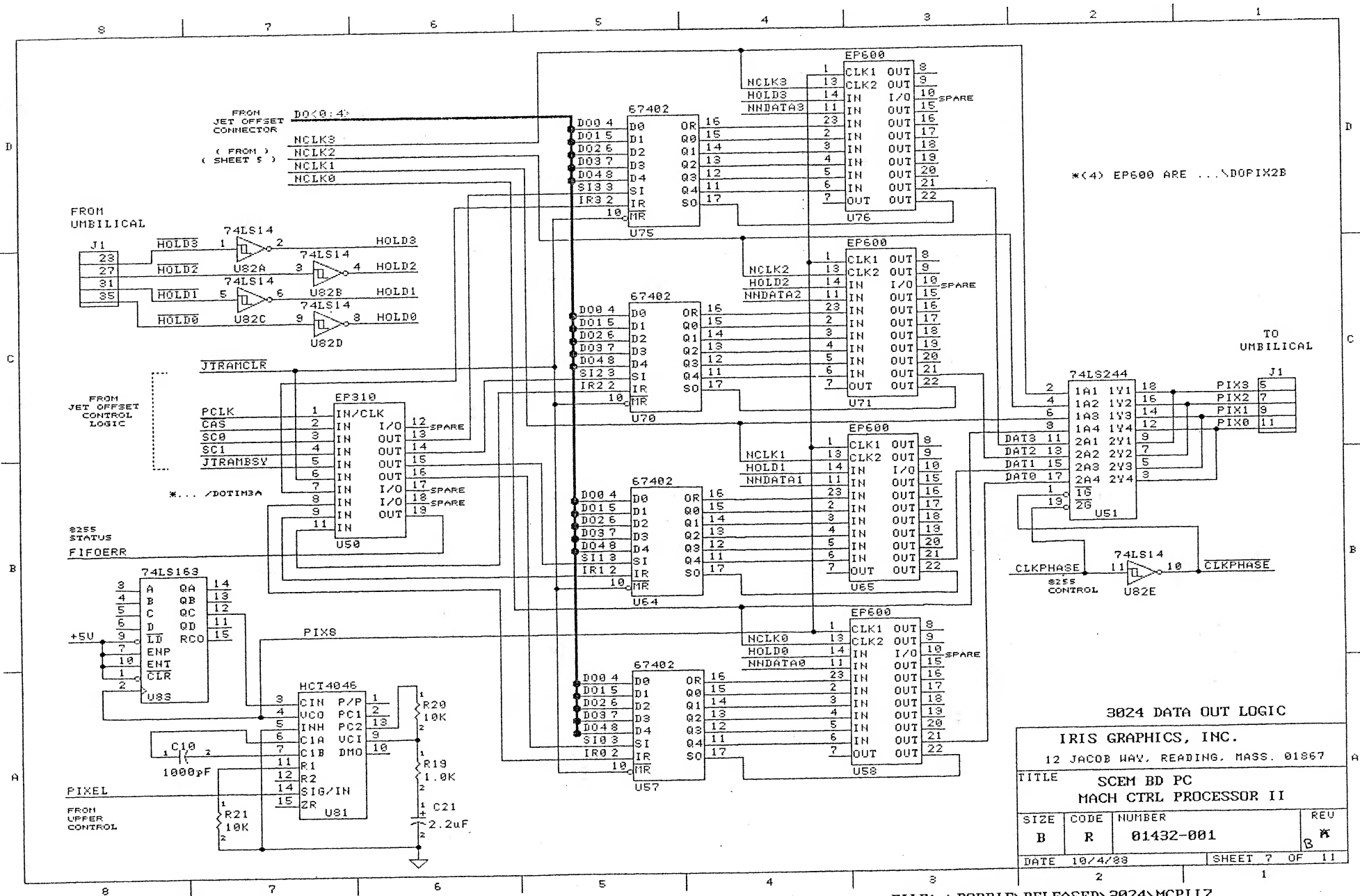
12 JACOB WAY, READING, MASS. 01867

TITLE			
SCEN BD PC			
MACH CTRL PROCESSOR II			
SIZE	CODE	NUMBER	REV
B	R	01432-001	B
DATE		SHEET	
10/4/88		5 OF 11	

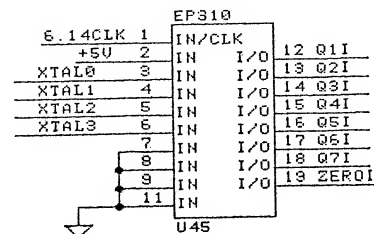
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FILE: \ROBBIEN\RELEASED\3024\MCP116

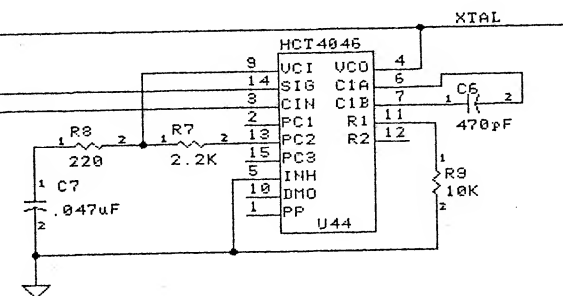
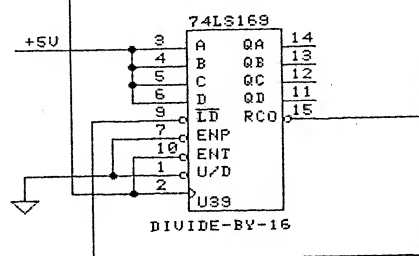


FILE: \ALTERA\FMF\DIU93-108



FOR F(CLOCK) = 6.144 MHz

F(XTAL)	FREQ. #
1057 KHz	16
1045	15
1035	14
1024	13
1013	12
1003	11
993	10
983	9
973	8
964	7
954	6
945	5
936	4
927	3
919	2
910	1



XTAL GENERATOR CIRCUIT

IRIS GRAPHICS, INC.

12 JACOB WAY, READING, MASS. 01857

TITLE SCHEM BD PC
MACH CTRL PROCESSOR II

SIZE	CODE	NUMBER	REV
B	R	01432-001	B

DATE 10/4/88 SHEET 9 OF 11

FILE: \ROBBIE\RELEASED\3024\MCP119

* NOTE: CONNECTORS J10A AND J10B
THRU J17A AND J17B
ARE WIRED AS SHOWN BELOW.

J10 ... J17

JA	A1	I/OCHCK
	A2	SD7
	A3	SD6
	A4	SD5
	A5	SD4
	A6	SD3
	A7	SD2
	A8	SD1
	A9	SD0
	A10	I/OCHRDV
	A11	PCAEN
	A12	SA19
	A13	SA18
	A14	SA17
	A15	SA16
	A16	SA15
	A17	SA14
	A18	SA13
	A19	SA12
	A20	SA11
	A21	SA10
	A22	SA9
	A23	SA8
	A24	SA7
	A25	SA6
	A26	SA5
	A27	SA4
	A28	SA3
	A29	SA2
	A30	SA1
	A31	SA0

JB	B1	GND
	B2	RESETDRU
	B3	+5V
	B4	PCIRQ9
	B5	-5V
	B6	PCDRQ2
	B7	-12V
	B8	DMS
	B9	+12V
	B10	GND
	B11	SMEHW
	B12	SMEHR
	B13	PCIOH
	B14	PCIOR
	B15	PCDACK3
	B16	PCDRQ3
	B17	PCDACK1
	B18	PCDRQ1
	B19	REFRESH
	B20	CLK
	B21	PCIRQ7
	B22	PCIRQ6
	B23	PCIRQ5
	B24	PCIRQ4
	B25	PCIRQ3
	B26	PCDACK2
	B27	I/C
	B28	BALE
	B29	+5V
	B30	OSC
	B31	GND

*NOTE: CONNECTORS J18C AND J18D
THRU J21C AND J21D
ARE WIRED AS SHOWN BELOW.

J18 ... J21

JC	C1	SBHE
	C2	LA23
	C3	LA22
	C4	LA21
	C5	LA20
	C6	LA19
	C7	LA18
	C8	LA17
	C9	PCHEMR
	C10	PCHEMW
	C11	SD08
	C12	SD09
	C13	SD10
	C14	SD11
	C15	SD12
	C16	SD13
	C17	SD14
	C18	SD15

JD	D1	MEMCS16
	D2	I/OCS16
	D3	PCIRQ18
	D4	PCIRQ11
	D5	PCIRQ12
	D6	PCIRQ13
	D7	PCIRQ14
	D8	PCDACK0
	D9	PCREQ0
	D10	PCDACK5
	D11	PCDRQ5
	D12	PCDACK6
	D13	PCDRQ6
	D14	PCDACK7
	D15	PCDRQ7
	D16	+5V
	D17	MASTER
	D18	GND

FROM AC/DC
DISTRIBUTION

J5	1	+32V
	2	+16V
	3	GND
	4	CGND

TEST CONNECTOR

J26	1	CLKPHASE
	2	SIG3
	3	SIG2
	4	SIG1
	5	SIG0
	6	XTAL0
	7	XTAL1
	8	XTAL2
	9	XTAL3
	10	GND

FROM POWER SUPPLY

J8	1	POWEROK
	2	+5V
	3	+12V
	4	-12V
	5	GND
	6	GND

J9	1	GND
	2	GND
	3	-5V
	4	+5V
	5	+5V
	6	+5V

TO PIXEL SWITCH

J1	1	CGND
	2	+16V
	3	+32V
	37	+12V
	38	-12V
	39	+5V
	4	GND
	6	
	8	
	10	
	12	
	14	
	20	
	24	
	28	
	32	
	36	
	40	

* NOTE: C100 - C188 AND C190 - C202 ARE 0.1uF DECOUPLING CAPACITORS.

IRIS GRAPHICS, INC.

12 JACOB WAY, READING, MASS. 01867

TITLE SC6M BD PC
MACH CTRL PROCESSOR II

SIZE	CODE	NUMBER	REV
B	R	01432-001	B*

DATE 10/4/88 SHEET 11 OF 11

FILE: \ROBBIE\RELEASED\3024\MCP1111